



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

Handwritten text, possibly a signature or title, in cursive script.

THIRTY-FIFTH ANNUAL REPORT
OF
3657100
THE LOCAL GOVERNMENT BOARD,
1905-06.

S U P P L E M E N T

IN CONTINUATION OF THE

REPORT OF THE MEDICAL OFFICER
For 1905-06,
ON SANATORIA FOR CONSUMPTION AND CERTAIN OTHER
ASPECTS OF THE TUBERCULOSIS QUESTION.

Presented to both Houses of Parliament by Command of His Majesty.



NEW YORK
PUBLIC
LIBRARY

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., FETTER LANE, E.C.,
and 32, ABINGDON STREET, WESTMINSTER, S.W. ;
or OLIVER & BOYD, TWEEDDALE COURT, EDINBURGH ;
or E. PONSONBY, 116, GRAFTON STREET, DUBLIN.

1908.

[C.A. 3657.] Price 10s. 2d.

SALE OF GOVERNMENT PUBLICATIONS.

The under-mentioned Firms have been appointed sole Agents for the sale of Government Publications, including Parliamentary Reports and Papers, Acts of Parliament, Record Office Publications, &c., &c. (with the undermentioned exceptions), and all such works can be purchased from them either directly or through retail booksellers, who are entitled to a discount of 25 per cent. from the published prices:—

IN ENGLAND:—Messrs. WYMAN AND SONS, LTD., Fetter Lane, E.C.

IN SCOTLAND:—Messrs. OLIVER AND BOYD, Tweeddale Court, Edinburgh.

IN IRELAND:—Mr. E. PONSONBY, 116, Grafton Street, Dublin.

Hydrographical Works of the Admiralty are sold by Mr. J. D. POTTER, 145, Minories, E.C. Patent Office Publications are sold at the Patent Office. (Classified Abridgments of Patent Specifications are sold also by Wyman and Sons, Ltd.)

The Publications of the ORDNANCE SURVEY and of the GEOLOGICAL SURVEY can be purchased from Agents in most of the chief towns in the United Kingdom, through any Bookseller, or from the Director General of the Ordnance Survey, Southampton, or, in the case of Ireland, from the Superintendent, Ordnance Survey, Dublin. In addition, Small Scale Maps are, as a rule, procurable at Railway Bookstalls in England and Wales.

The Journal of the Board of Agriculture is published monthly by the Board, at 4, Whitehall Place, S.W. Prior to April, 1907, it was published by Messrs. Laughton and Co., Ltd., 3, Wellington Street, Strand, W.C. Price 4d.

The following is a list of some of the more important Parliamentary and Official Publications recently issued:—

Statutes—

Public General Acts, 1907. In separate chapters, at varying prices.

Local and Personal Acts, 1907. 3d. per 4 pp.

1s. 2d.

Army Act—Consolidation—including amendments to 1907.

3s.

Public General, Session 1907. With Index, Tables, &c. Cloth.

10s.

Index to Local and Personal Acts, 1801–1899.

Index to Local and Personal Acts, 1900–1906. Each year may be purchased separately.

7s. 6d. each.

Second Revised Edition. 1235–1886. XVI. Vols.

Statutes in Force. Chronological Table and Index of. 22nd Edition. To the end of the Session 6 Edward VII. (1906). 2 Vols.

10s. 6d.

Statutory Rules and Orders other than those of a Local, Personal, or Temporary Character. With a List of Statutory Orders of a Local Character arranged in classes; an Appendix of certain Orders in Council &c.; and an Index. Issued in 1890 to 1906.

10s. each.

Statutory Rules and Orders revised. Statutory Rules and Orders, other than those of a Local, Personal, or Temporary Character, in force on December 31, 1903. Vols. I to XIII.

10s. each.

Statutory Rules and Orders in force on 31st December 1906. Index to.

10s.

VOTES AND PROCEEDINGS OF THE HOUSE OF COMMONS, as issued.

30s. complete.

MINUTES OF PROCEEDINGS OF THE HOUSE OF LORDS, as issued.

30s. complete.

HISTORICAL MANUSCRIPTS. Reports of the Royal Commissioners. In course of issue.

ROYAL COMMISSIONS. Evidence, in separate parts:—Canals; Mines; Irish Railways; Shipping Rings.

[Cd. 3586.] FACTORIES AND WORKSHOPS. Report of Chief Inspector, 1906.

3s. 2d.

[Cd. 3614, 3615.] ACCIDENTS OF LOCAL AUTHORITIES. Vol. I. Report of Departmental Committee. Vol. II. Evidence.

3s. 8d.

[Cd. 3686.] LOCAL GOVERNMENT BOARD. 36th Report, 1906–07.

3s. 9d.

[Cd. 3715, 3792.] HOUSE-LETTING IN SCOTLAND. Report of Departmental Committee, with Evidence, &c.

2s. 8d.

[Cd. 3740.] CAMPAIGN: Taxation of Unimproved Value of Land.

1s.

[Cd. 3683, 3684.] COAST EROSION AND RECLAMATION. Royal Commission. Report with Evidence and Appendices.

8s. 10d.

[Cd. 3660, 3661.] TUBERCULOSIS, HUMAN AND ANIMAL. Royal Commission. Appendix, Part II, to 2nd Report. In 2 vols.

13s.

[Cd. 3793.] TINNING OF METALS. Report on Dangerous or Injurious Processes.

1s.

[Cd. 3846.] CHECKWEIGHING IN IRON AND STEEL TRADES. Report of Departmental Committee.

2d.

[Cd. 3848.] DANGERS ATTENDANT ON BUILDING OPERATIONS. Report of Departmental Committee, with Evidence, &c., and Draft for Regulations.

1s. 9d.

MINES in the United Kingdom and the Isle of Man. List of, for 1906.

3s. 8d.

QUARRIES Do. do. do. 1906.

4s. 10d.

MINES ABANDONED. Plans of. List of the. Corrected to 31st December 1906.

1s.

Trade and Commerce, &c.:—

[Cd. 3691.] STATISTICAL ABSTRACT OF THE UNITED KINGDOM. 1892–1906.

1s. 7d.

[Cd. 3253.] Do. do. COLONIES. 1891–1905.

1s. 11d.

[Cd. 3291.] Do. do. FOREIGN COUNTRIES. 1895 to 1904–05.

1s. 6d.

[Cd. 3724.] Do. do. BRITISH INDIA. 1896–1897 to 1905–1906.

1s. 3d.

[Cd. 3466, 3529, 3687.] TRADE OF THE UNITED KINGDOM, 1906. Vols. I., II., and III.

13s. 9d.

[Cd. 3690.] LABOUR STATISTICS, UNITED KINGDOM. 11th Abstract, 1905–06.

1s. 2d.

[Cd. 1761, 2337, 2669.] BRITISH AND FOREIGN TRADE AND INDUSTRIAL CONDITIONS. Tables and Charts.

7s.

THIRTY-FIFTH ANNUAL REPORT
OF
THE LOCAL GOVERNMENT BOARD.
1905-06.

S U P P L E M E N T

IN CONTINUATION OF THE

REPORT OF THE MEDICAL OFFICER
For 1905-06,
ON SANATORIA FOR CONSUMPTION AND CERTAIN OTHER
ASPECTS OF THE TUBERCULOSIS QUESTION.

Presented to both Houses of Parliament by Command of His Majesty.



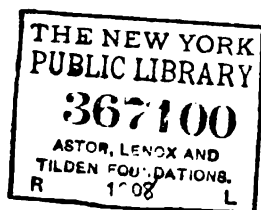
NEW YORK
JAN 10 1906

LONDON:
PRINTED FOR HIS MAJESTY'S STATIONERY OFFICE,
By DARLING & SON, LTD., 34-40, BACON STREET, E.

And to be purchased, either directly or through any Bookseller, from
WYMAN AND SONS, LTD., FETTER LANE, E.C.,
and 32, ABINGDON STREET, WESTMINSTER, S.W. ;
or OLIVER & BOYD, TWEEDDALE COURT, EDINBURGH ;
or E. PONSONBY, 116, GRAFTON STREET, DUBLIN.

1908.

[Cd. 3657] Price 10s. 2d.



NOY WOD
2081
V888L

PUBLIC HEALTH.

REPORT

ON

SANATORIA FOR CONSUMPTION

AND

CERTAIN OTHER ASPECTS

OF THE

TUBERCULOSIS QUESTION

BY

H. TIMBRELL BULSTRODE, M.D.

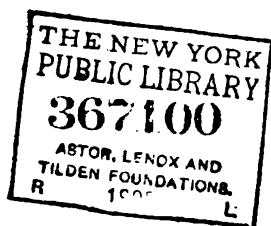


TABLE OF CONTENTS.

	PAGE.
PREFACE BY THE MEDICAL OFFICER TO DR. BULETRODE'S REPORT	vii
PART I.	
CHAPTER I.—INTRODUCTION	3
CHAPTER II.—THE DECLINE IN THE DEATH-RATE FROM PULMON- ARY TUBERCULOSIS IN ENGLAND AND WALES. (With Charts)	32
CHAPTER III.—THE DEGREE OF COMMUNICABILITY OF PULMON- ARY TUBERCULOSIS	49
CHAPTER IV.—CERTAIN FACTORS IN THEIR INFLUENCE ON THE PREVALENCE OF PULMONARY TUBERCULOSIS ...	78
CHAPTER V.—THE PREVALENCE OF TUBERCULOSIS IN THE HUMAN SUBJECT AND THE EVIDENCE WHICH SUCH PREVALENCE AFFORDS OF THE CURA- BILITY OF THE DISEASE	104
CHAPTER VI.—THE DURATION OF RECOGNISED PULMONARY TUBERCULOSIS IN PRE-SANATORIUM TIMES ...	108
CHAPTER VII.—THE INFLUENCE OF EARLIER RECOGNITION AND BETTER TREATMENT UPON THE DEATH-RATE OF THE MALADY	116
CHAPTER VIII.—THE EVOLUTION OF THE SANATORIUM IDEA ...	119
CHAPTER IX.—EXISTING PROVISION OF SANATORIA AND HOSPITALS FOR CONSUMPTION IN ENGLAND AND WALES WITH MAP SHOWING DISTRIBUTION OF SUCH INSTITUTIONS IN 1907	131
CHAPTER X.—STATUTORY POWERS FOR THE PROVISION OF SANATORIA BY COUNTY COUNCILS, DISTRICT COUNCILS, AND BOARDS OF GUARDIANS	140
CHAPTER XI.—GENERAL CONSIDERATIONS AS REGARDS STATISTICS RELATIVE TO PATIENTS TREATED IN SANATORIA	145
CHAPTER XII.—IMMEDIATE RESULTS OF SANATORIUM TREATMENT	153
CHAPTER XIII.—DIFFERENCE AS REGARDS IMMEDIATE RESULTS BETWEEN "EARLY" AND "ADVANCED" CASES...	159
CHAPTER XIV.—LASTING EFFECTS OF SANATORIUM TREATMENT ...	168
CHAPTER XV.—THE NECESSITY FOR THE "AFTER CARE" OF PATIENTS DISCHARGED FROM SANATORIA ...	191
CHAPTER XVI.—ON THE EMPLOYMENT OF PATIENTS WHILE WITHIN SANATORIA	196
CHAPTER XVII.—THE IMPORTANCE OF EARLY DIAGNOSIS WHETHER FROM THE VIEWPOINT OF TREATMENT OR PREVENTION	213
CHAPTER XVIII.—THE SANATORIUM IN ITS EDUCATIONAL AND PRE- VENTIVE ASPECTS	216
CHAPTER XIX.—THE UTILISATION OF EXISTING ISOLATION HOSPITALS FOR EDUCATIONAL PURPOSES ...	219
CHAPTER XX.—THE DESIRABILITY FOR BETTER ORGANISATION AND FOR MORE CO-ORDINATION BETWEEN EXISTING AGENCIES AND INSTITUTIONS...	227

	PAGE.
CHAPTER XXI.—THE VALUE OF SANATORIA AS EXAMINED BY THE LIGHT OF LOCAL PHTHISIS DEATH-RATES (<i>With Chart</i>)	237
CHAPTER XXII.—THE INFLUENCE OF "ISOLATION" OF PHTHISICAL PATIENTS IN WORKHOUSES AND INFIRMARIES UPON THE PREVALENCE OF PHTHISIS. (<i>With Charts</i>)	240
CHAPTER XXIII.—THE GERMAN COMPULSORY INSURANCE SYSTEM AS A FACTOR IN THE CONTROL OF PHTHISIS ...	248
CHAPTER XXIV.—THE EXCLUSIVE RETENTION OF SANATORIA FOR THE TREATMENT OF "EARLY" AND "SUITABLE" CASES AND THE RESULTS THEREOF	253
CHAPTER XXV.—HYGIENE TEACHING IN THE PUBLIC ELEMENTARY SCHOOLS AND THE MEDICAL INSPECTION OF CHILDREN THEREIN AS A MEANS TOWARDS CONTROL OF TUBERCULOSIS	255

PART II.

INDEX TO CHAPTER I.	263
CHAPTER I.—THE PUBLIC SANATORIA OF ENGLAND AND WALES AND THE RESULTS OF TREATMENT AT CERTAIN OF THESE INSTITUTIONS	265
CHAPTER II.—THE SELECTION OF A SANATORIUM SITE	550
CHAPTER III.—CERTAIN CONDITIONS RELATIVE TO SANATORIUM BUILDINGS	557

PART III.

CHAPTER I.—GENERAL CONSIDERATIONS AS REGARDS THE NOTIFICATION OF PULMONARY TUBERCULOSIS	567
CHAPTER II.—VOLUNTARY NOTIFICATION OF PULMONARY TUBERCULOSIS. (<i>With Charts</i>)	573
CHAPTER III.—COMPULSORY NOTIFICATION OF PULMONARY TUBERCULOSIS. (<i>With Charts</i>)	587
CHAPTER IV.—VOLUNTARY AND COMPULSORY NOTIFICATION AS CONTRASTED FROM THE RECORDS OF MANCHESTER, BRIGHTON, LIVERPOOL, SHEFFIELD AND NEW YORK. (<i>With Charts</i>)	603

PART IV.

CHAPTER I.—THE BEHAVIOUR OF PULMONARY TUBERCULOSIS IN GERMANY. (<i>With Chart</i>)	613
CHAPTER II.—THE GERMAN WORKMEN'S INSURANCE SYSTEM AS A FACTOR IN CONTROL OF TUBERCULOSIS	618
(<i>Map showing distribution of Sanatoria in the German Empire.</i>)	
CHAPTER III.—THE RESULTS OF SANATORIUM TREATMENT IN GERMANY. (<i>With Charts, Tables, and Diagrams</i>)	642

REPORT.

TO THE RIGHT HONOURABLE JOHN BURNS,
M.P., PRESIDENT OF THE LOCAL GOVERN-
MENT BOARD.

SIR,

EXCEPTIONAL interest, public as well as professional, in recent years has been manifested in phthisis sanatoria as agencies in arresting the progress of pulmonary tuberculosis in persons the subjects of this disease. An expectation is widely entertained that by means of establishments of this class the observed decline in this country of the death-rate from phthisis may be facilitated and accelerated. These matters, with other aspects of the question of prevention of tuberculosis, have engaged the attention of the Board, who in 1902 instructed Dr. Bulstrode to visit the public phthisis sanatoria in this country, and to report upon the various aspects of the sanatorium question.

It was a necessary precedent to discussing the facts accumulated by him that Dr. Bulstrode should take account of the progress of knowledge as to the nature of tuberculosis, of its past and present prevalence in this country, and of the views that have been and that are entertained as to the share borne by one and another possible agency in the causation and in fostering of the malady. In this connexion he has found himself called on to give attention to occurrence antecedent to sanatorium days of spontaneously cured tuberculosis—*i.e.*, to *post-mortem* detection of disease of this nature never recognised as present in the individual during life—and to occurrence also of much recognised pulmonary tuberculosis obviously of a chronic character. To tuberculosis in these aspects therefore he devotes the first seven chapters of his report.

In succeeding chapters Dr. Bulstrode deals historically with the circumstances and considerations in view of which the phthisis sanatorium as we know it to-day has gradually evolved ; gives account generally of the phthisis sanatoria and hospitals for consumption now existent in England and Wales ; and discusses in some detail the statutory powers possessed by local Sanitary Authorities, County Councils and Boards of Guardians for erection or acquirement of, and for participation in, sanatoria of this class. Later, he considers a large body of statistics relative to patients treated in sanatoria in reference to results, immediate and remote, accruing to such persons ; and it is on the tuberculosis question in these other and important aspects that the data adduced by Dr. Bulstrode are of special and immediate interest.

As to the value of sanatorium treatment in pulmonary tuberculosis, Dr. Bulstrode does not consider it possible, or indeed desirable, to draw definite conclusions on the evidence so far available. But there can be no doubt, he thinks, that the *immediate* result to the individual of sanatorium treatment is in the main decidedly encouraging ; commonly patients respond quickly and satisfactorily to the better food, the rest, the purer air, and the regulated living which are essential elements of sanatorium régime. He notes that the best immediate results are secured in the case of patients admitted to sanatorium treatment in the earlier stages of their malady, and that in the case of patients advanced in phthisis improvement of their condition, if it occurs, is commonly far less durable in its nature, notwithstanding a very remarkable temporary amendment not infrequently manifested in such persons.

It is as to "after results"—*i.e.*, maintenance by the patient subsequent to discharge of his improved condition brought about by sojourn in a sanatorium—that Dr. Bulstrode is hesitant. The statistics available to him do not, he points out, furnish, save in exceptional instances, data as complete and detailed as is requisite in this connection. Too often "immediate results" and "after results" are, he considers, mingled and confused ; and he submits a method of tabular statement of facts designed in prevention of ambiguity thus

arising. He would prefer that in judging the remoter benefit referable to sanatorium treatment all cases discharged from the institution within a period of twelve months should be excluded from consideration.

In this connection it is important to note that in Dr. Bulstrode's view "after results" are largely determined not only by the method of selection of cases adopted by the sanatorium, but also by the "after care" which can be bestowed on the patients in sequence to their discharge from the institution. "Fit for work" he regards as an indefinite term by no means necessarily connoting ability of the discharged patient to follow day by day the employment customary with him antecedent to his illness. And he is of opinion that it is undesirable as a practice to send patients back at once to their former work, or to any employment entailing severe physical labour; work of the latter class should, Dr. Bulstrode thinks, not be engaged in by recently discharged patients unless prior to leaving the sanatorium they have been put through a series of labour tasks of gradually increasing severity, and in this way their ability to undertake a full day's work sufficiently demonstrated. He notes, indeed, that at several sanatoria endeavour is being made to accustom patients to carefully graduated increase of physical exertion so as to prepare them for everyday labour on their discharge from the institution. As a system, however, this course cannot hopefully be adopted unless the sanatorium secures in the main patients which are suitable in the sense of being "early" cases.

Whatever may be the precise value of sojourn in a sanatorium, Dr. Bulstrode considers that there can be no question that the average of lasting benefit would be materially enhanced were a system of selection generally adopted for securing as inmates persons in the earliest phase of their malady; and to this end he would see devised better machinery for attracting as patients those persons who are but beginning to manifest pulmonary tuberculosis. Indeed, upon this point there would appear to be little difference of opinion. But under existing circumstances, as is shown by Dr. Bulstrode from a plurality of annual reports from sanatoria, there is much difficulty in securing

cases of this class; difficulty so great that certain sanatoria come to devote no small proportion of their beds to the temporary accommodation in each instance of persons, the subjects of pronounced, perhaps of advancing phthisis, who are in need of disciplinary instruction as to managing the remainder of their lives in the best interests of themselves and others. Among conditions conducing to difficulty in securing "early cases" are want of appreciation by the public of the importance of early recognition and treatment of phthisis, and, above all, indisposition on the part of the working man or working woman of this country to relinquish his or her employment. Parents, the subjects of phthisis, especially are averse to relegate their children to charity or to the Poor Law; and unless they are able to arrange for support of their families during their own sojourn in the sanatorium, are apt to avoid medical advice altogether, or to be content, while still continuing their employment, with casual attendance as out-patients at some hospital or dispensary.

It is in securing early cases of phthisis for sanatorium treatment that Germany would seem to be in advance of this country; a circumstance due, no doubt, in no small degree to the far-reaching system of compulsory insurance of workpeople against sickness and incapacity which is in force in the German Empire. By means of this system the workman when attacked by tuberculosis has a legal claim on insurance funds for medical treatment and maintenance in his own case and for the support also of his family. Thus it comes about that he can, without social disqualification such as is associated with receipt of Poor Law relief or of charity—without, that is, forfeiting in any degree his sense of self-respect—procure at once at the very onset of his malady treatment requisite for himself, and at the same time maintenance of those belonging to him. Dr. Bulstrode evidently regards the workmen's insurance system of Germany as having played a very important part in the reduction of pulmonary tuberculosis during recent years in that country; and accordingly he supplies—Part IV. of his report—a full account of the manner in which the insurance system in question is calculated to aid and promote administrative effort in repression of this disease.

To the vexed question of "Notification of Pulmonary Tuberculosis" Dr. Bulstrode devotes a separate section of his report. In it he gives account of the more important steps which have been taken in the way of adoption of phthisis notification, "voluntary" and "compulsory," and supplies interesting and instructive charts exhibiting the behaviour of phthisis in the matter of death rates in different towns *before* and *after* adoption of the one or the other measure. Dr. Bulstrode does not consider that the time has yet arrived for judging, in the light of phthisis death rates, the value of "notification" in repression of pulmonary tuberculosis; and he makes no pronouncement on this question. Meanwhile he notes that, so far, the rate of that fall in the phthisis mortality which has for many years been witnessed throughout this country, has not become obviously accelerated in towns which have in one form or other adopted notification of the disease, and he awaits further study of the subject on lines similar to those indicated by him. Whether or not "notification" is, along with other measures, conducing in the present to diminution of sickness, of incapacity, from phthisis, is quite another matter, and Dr. Bulstrode recognises that acceptance of the current working theory that pulmonary tuberculosis in man results in the main from case to case infection has tended in many districts to the adoption of measures which must needs be exercising wholesome effect on public health generally; as for instance by house to house inspection of working-class dwellings and incidental instruction of their inmates in the elements of hygiene, personal, domestic and public. As to the relative advantages in the above sense of "voluntary" and "compulsory" notification of phthisis Dr. Bulstrode is unable, in the present at any rate, to give preference to compulsion, and he lays stress on the abiding disabilities liable to accrue to the phthisis patient in the event of pulmonary tuberculosis coming to be regarded officially as infectious in like sense with scarlatina or small-pox. It is clear, indeed, that in Dr. Bulstrode's view, notification of the disease should not be made compulsory except under special enactment such as (at Sheffield and at Bolton) expressly dissociates administratively phthisis and every-day infectious disease. As a practicable matter, he considers that notification of the disease will be acceptable or the reverse to the public of our industrial

areas according as definite assistance is customarily afforded to sufferers by the malady, and he cites the experience of Brighton as indicating that where obvious personal advantages accrue to the patient—where he is not harassed in a social sense as the result of being found phthisical—a system of “voluntary” notification may yield useful results.

On the other hand, Dr. Bulstrode is of opinion that where the confidence of the patient is not respected, where help is not accorded him and his family also in their trouble, or where as the result of the sanitary authorities’ ministrations the phthisical person becomes publicly ostracised, notification whether “compulsory” or “voluntary” is likely to fail almost wholly in securing the object which it is intended to serve. He considers, indeed, that under circumstances of stringent administration based on notification not a few phthisical persons would be tempted to conceal their malady until a stage of the disease was arrived at so advanced as to preclude any but fatal results. In his view, definite encouragement of people to seek advice and assistance at the earliest stage of their phthisis is strongly called for alike in administrative as in public health sense.

Dr. Bulstrode embodies in his report observations as to considerations to be held in view in making selection of sites for sanatoria, and on conditions to be borne in mind in arrangement and construction of sanatorium buildings.

I have the honour to be,

Sir,

Your obedient Servant,

W. H. POWER.

PART I.

In this section of the Report attention is directed to certain general features of the tuberculosis problem of which some knowledge is necessary in order that the accounts furnished in Part II. of the several sanatoria and of the statistics relative thereto may be more easily followed.

CHAPTER I.

INTRODUCTION.

The object of this report being to set out the value, immediate or prospective, of "sanatorium treatment" of pulmonary tuberculosis in persons of the poorer classes, there is convenience in adverting to the nature of tuberculosis and to certain beliefs that have from time to time been entertained respecting its origin and causation.

Tuberculosis is by general consent now regarded as a disease resulting from the life processes within a non-resistant animal host of a specific parasite, vegetable in its nature. From this point of view the disease is to be considered as the outcome of two essential factors—seed and soil; their inter-operation being governed by the conditions under which they are brought into sustained relation. So far as the human body is concerned medical experience is to the effect that development of tuberculosis therein depends very largely on the medium and on the channel whereby the bacillus of tubercle is introduced, as also on the vulnerability, the "susceptibility," of the tissues with which the bacillus, after introduction, becomes associated; it being well understood that many persons harbour the bacillus with impunity. Professor Osler* indeed, thus sums up present beliefs on the subject:—

"There are tissue-soils in which the bacilli are, in all probability, killed at once—the seed has fallen by the way-side. There are others in which a lodgment is gained and more or less damage done, but finally the day is with the conservative protecting force—the seed has fallen upon stony ground. There are tissue-soils in which the bacilli grow luxuriantly; caseation and softening, not limitation and sclerosis, prevail and the day is with the invader—the seed has fallen upon good ground."

That the opportunities of acquiring tuberculosis are infinite is a belief of old standing. Recognition of tissue resistance, i.e., of "rocky soil," as an element in escape from tuberculous infection is of less antiquity than belief in an all-pervading cause of phthisis. But the importance of special susceptibility of an animal body as affording high encouragement to the tubercle bacillus is now commonly accepted. Gideon Harvey, in the second edition of his "Morbus Anglicus" (1672), wrote:—

"It's a great chance, we find, to arrive at one's grave in this English climate without a smack of consumption, death's direct door to most hard students, divines, physicians, philosophers, deep lovers, zealots in religion."

There is, too, the German saying *jedermann hat am ende ein bischen tuberculose*, a proposition largely supported by post-mortem records, which show that among the poorer classes a

* The Principles and Practice of Medicine, by William Osler, M.D., &c., &c., (Fifth Edition), London: Sidney Appleton, 1902.

considerable proportion of persons have, at some time or other, developed tuberculosis possibly without being aware of the fact, but have nevertheless become in effect cured of the malady.

As to this, Professor Osler* sums up his experience in the words :—

“The germ of tuberculosis is ubiquitous; few reach maturity without infection; none reach old age without a focus somewhere.”

And he adds :—

“That we do not all die of the disease is owing to the resistance of the tissues; in a word, to an unfavourable, *i.e.*, the rocky soil in which the seeds have fallen.”

Dr. Arthur Ransome, F.R.S., in his Weber-Parkes Prize Essay for 1897, states as an axiom, justified by the researches of a multitude of observers, that :—

“No infection can take place unless the bodily tissues are in such a condition as to receive, and to nourish into colonies the bacilli which have found an entrance.”

Dr. Horton-Smith Hartley, M.V.O., writing in 1902 in the third edition of Quain's Dictionary of Medicine, observes that we must not lose sight of the fact that *the bacillus is but one factor in the causation of the disease*, and that to produce the malady other influences of a debilitating nature are also required.

Dr. Arthur Latham† insists that infection

“does not and cannot take place unless a man happens to be susceptible, or, if we put it in other words, unless what we call for want of a better term, his vitality has been so lowered by his surroundings, by disease, or by quality or quantity of his food that he is powerless to resist infection, although previously immune.”

As Dr. F. C. Shrubbsall ‡ expresses it :—

“If we cannot conceive of illness arising without the seeds, whether micro-organisms or otherwise, which are sown as a result of the individual mode of life and surroundings, so also we should regard the soil, the product of ancestral inheritance, as profoundly modifying and often doubtless prohibiting the growth of the proximate causes of disease.”

Dr. T. Glover Lyon thinks that there are three factors in phthisis—infection, hereditary susceptibility, and acquired susceptibility; in fact, as the late Mr. T. W. Thompson stated, “the *real cause* of any effect is generally, if not always, the resultant of a combination of causes.”

Experimentally, too, as Professor Osler points out, the work of Trudeau bears eloquent testimony to the importance of soil

* The Home in its Relation to the Tuberculosis Problem, by William Osler, M.D. First Annual Report of the Henry Phipps Institute, 1905.

† The Diagnosis and Modern Treatment of Pulmonary Consumption. By Arthur Latham, M.A., M.D. Oxon., M.A. Cantab. (Second edition.) Baillière, Tindall & Cox, London. 1905.

‡ The Anthropometric Investigation of Hospital Patients. By F. C. Shrubbsall, M.D. Cantab., *British Medical Journal*, December 24th and 31st, 1904.

and of environment in the development of tuberculosis. Rabbits inoculated with tuberculous material and confined in dark, damp places, into which entered neither sunlight nor fresh air, rapidly succumbed to the disease, while others inoculated in similar fashion but allowed to approach their natural state of running wild, either recovered or manifested but very slight lesions.

Among apes, monkeys, rabbits, guinea-pigs, and cattle in their natural state the disease is practically unknown, but under domestication and confinement, monkeys and cattle suffer enormously from the disease.

The tubercle bacillus is, circumstances favouring it, capable of growing upon practically every tissue or organ of the human body: the lungs, larynx, bones, joints, skin, intestines, and viscera. But by far the most common seat of its detected manifestation is in the lungs; some 70 per cent. of the total cases of tuberculosis exhibiting, at death, pulmonary lesions. Until recently this preponderance of pulmonary over other forms of tuberculosis has been considered due in the main to spread of the disease from man to man almost exclusively by means of infection conveyed through the air directly to the lungs during the act of inspiration, *i.e.*, it has been assumed that specifically infected dust was thus brought in contact with the air vessels of the lungs.

But, as will presently be seen, evidence adduced by reliable and competent observers is accumulating which points to infection of the lungs *via* the intestinal tract and the lymphatics. It is suggested, indeed, that this is the main route of tuberculous infection, and this altogether apart from the question as to whether it be held that human or bovine disease is the main cause of the malady in man.

In this connection it may be remarked that the evidence of direct communicability of pulmonary tuberculosis from man to man is of a somewhat conflicting and contradictory nature, as also that no theory at present enunciated suffices to explain adequately all the facts observed.

Doubtless there is still much to be learnt. For instance, as has been suggested by Dr. W. H. Hamer, of the Medical Department of the London County Council, it is conceivable that as with malaria and yellow fever so with tuberculosis—for effective transference of infection from man to man some intermediate host may be necessary.

Moreover, the question of racial proclivity or susceptibility must not be lost sight of in considerations relative to the prevalence of tuberculosis. There is some evidence to suggest, for instance, that the Celtic race, whatever part of the globe they may be inhabiting, are more prone to tuberculosis and lunacy than other races. Shruballs quotes Dr. Beddoe to the effect that "Although local situation, varieties of social habit,

occupations and the like, obscure in Briton anything like racial tendency; it would appear that the Gaelic and Ibero-Keltic stocks are, *ceteris paribus*, rather more subject to phthisis than the Saxon or Scandinavian."

In an interesting report as to the alleged increase of insanity in Ireland by the Inspectors of Lunacy,* it is pointed out that insanity develops at a much greater rate amongst the Irish emigrants to America than amongst those who emigrate from other countries, and I may add that there are certain data which point in the same direction as regards the proneness of the Irish to tuberculosis.

This suggestion may well be borne in mind in considerations relative to the recorded increase of tuberculosis in Ireland, although the problem is complicated by the fact that the emigration of the fit which has been going on for so many years may have left behind in Ireland a large number of tuberculous or pre-tuberculous, and thus may have disturbed the numerical relation between the tuberculous and the non-tuberculous.

Belief that consumption is a communicable disease is a venerable one, although it is perhaps difficult now to determine upon what evidence such belief was founded. It is possible that it had no better basis than the widespread character of the malady, and consequently the frequent association of cases both in time and place. On the other hand the matter may have been reasoned out more closely; possibly cases of infection by accidental inoculation may have practically demonstrated that the disease was inoculable, and thus inference may have arisen that the disease was of a highly communicable nature.

But whatever the origin of the belief there can be no question as to its prevalence, and in an accentuated form. Dr. Edward Smith,† writing on this subject in 1862, went so far as to express the opinion that "the contagious nature of the disease was perhaps universally believed by the ancients," and there is at least no room for doubt that in many parts of Southern Europe, particularly, perhaps, among the Latin races, this belief was very general. This conception of the disease was referred to by Aristotle, Isocrates, Rhazes, Galen, and many other writers of antiquity, and, as Cornet expresses it, "the doctrine of contagion is not an offspring of bacteriology, but is as old as medicine itself."

References to this belief abound indeed in general literature, and the attitude of the public towards the consumptive in days gone by is not without significance and interest for the existing generations.

* Supplement to Fifty-fourth Report of Inspectors of Lunatics, Ireland, 1906. Special report on the alleged Increase of Insanity.

† Consumption; its early and remediable stages by Edward Smith, M.D., LL.B., F.R.S.: Walton and Maberly, London, 1862.

One of the earliest English writers who referred to the subject of communicability was Dr. Everard Maynwaring,* who in 1667 wrote thus :—

“Society also is to be regarded, and you must not frequently converse with a phthisical person whose unwholesome breath may infect the sound by drawing in the putrid vapours that the other breathes forth ; but, above all, a phthiical bel-fellow is most dangerous to infect a sound person and chiefly to be avoided.”

A little later in the seventeenth century (1689), Richard Morton, in his “Phthisiologia,” accepts this view. But perhaps the most conclusive evidence as regards complete reliance on this belief comes to us from Spain, where, during the reign of Phillip V., a law was enacted imposing upon medical men the duty of notifying deaths due to phthisis. At Valencia, too, in 1737 the municipal authorities required, under heavy penalties, the notification of cases of the disease—in a word, there was *compulsory notification of phthisis* as far back as 1737.

The wholesale destruction by burning of clothing, &c., of persons dead of phthisis which had been adopted in Spain led, after a time, to a protest by Santiago Garcia ; and, according to Dr. Hauser,† of Madrid, this practice of “disinfection,” &c., passed into desuetude at the commencement of the nineteenth century.

Morgagni in the seventeenth century stated that in Italy the bedding of phthisical patients was burnt, and he (Morgagni) was afraid to make a necropsy of a body dead of phthisis, a fear which was apparently shared by Valsalva ; facts which, if true, certainly suggest that both these workers regarded tuberculosis as being at least an *inoculable* disease.

In France in 1781 the authorities of Nancy ordered the furniture of a phthisical woman, who was believed to have contracted her disease by sleeping with a consumptive patient, to be publicly burnt, and in 1754 the infectivity of tuberculosis was made the subject of a decree by the College of Physicians of Florence. It is alleged, too, that in Naples the disease had become almost epidemic in 1782, the death-rate from it being reported as 100 per 10,000 of the population. It seems at this time to have been the practice in Italy for patients suffering from consumption to be isolated and for their premises to be “disinfected” with substances such as vinegar and sea-water. The penalty for disobeying this injunction was three years’ imprisonment with the addition, in the case of nobles, of a fine of 300 ducats.

* A Treatise on Consumptives, by Everard Maynwaring, Dr. in Physick and Hermetick Philosophy, London. Printed for T. Basset, and are to be sold at his shop under St. Dunstan’s Church in Fleet Street. 1667.

† Hernandez Morejon : Historia Biografica de la Medicina Española, tome vii., p. 146, Madrid, 1852. Quoted by Dr. Ph. Hauser in his “Defense Sociale contre la Tuberculose,” Madrid, 1898.

Santiago Garcia, Sobre la Nulidad del Contagio. Quoted as above.

That similar views obtained in Spain and Portugal as late as 1839 is borne out by the pathetic experience of Chopin, who was himself a consumptive.

Georges Sand, who accompanied him, wrote :—

“ At the end of a month poor Chopin, who since he left Paris has continued to cough, became ill. I called in a physician, two physicians, three physicians, each one a greater than the other, who spread abroad the tale that our patient was in the last stage of phthisis. There was immense excitement. Phthisis is seldom seen in these climates, and is so classed as a contagious disease. We were regarded as pest breeders. The proprietors of the two small houses we had rented put us out of doors and threatened us with prosecution for infecting the houses.”

Although some of this belief in the infectiousness of phthisis seems to have largely died down during the early part of the nineteenth century, there remained many persons who, long before the discovery of the tubercle bacillus, held that the disease was at least communicable; and it is of historical interest to find that authorities who at one time embraced the doctrine of infectiousness of the disease subsequently abandoned the idea. This is said to have been the case with such masters of the subject as Laennec, Louis, and Portal.*

But before the first half of the nineteenth century had passed there commenced, in regard of phthisis, an era of observation and experiment which, ere the century closed, was destined to yield brilliant results in a pathological and bacteriological sense.

The researches of Laennec,† the discoverer of mediate stethoscopy, led him in 1831 to thus sum up the position :—

“ Il est beaucoup plus commun de trouver une *excavation* et quelques *tubercules crus déjà avancés* dans le sommet des poumons, et le reste de ces organes encore crépitants et sains d'ailleurs, farci d'une multitude innombrable de *très petits tubercules miliaires demi-transparentes* et dont *presque aucun ne présente encore de point jaune centrale*. Il est évident que ces tubercules miliaires sont le produit d'une éruption secondaire et fort postérieure à celle qui avait donné lieu aux excavations. Les résultats de l'ouverture des cadavres comparés à ceux de l'observation des malades, m'ont convaincu que ces éruptions secondaires se font à l'époque où les tubercules formés les premiers commencent à se ramollir.”

Laennec had thus, as a result of his naked eye observations, discovered that the diverse conditions found in the lungs of consumptive persons were due to varying stages in the progress of the tubercle; he pronounced, in fact, a doctrine, not to be accepted for years to come, of the *unity of phthisis*, and hence entertained a conception of the disease not inconsistent with its transmissibility from one part of the body to another.

In 1857 Buhl showed that pulmonary tuberculosis was, in the vast majority of cases, associated with the presence of caseous masses in other parts of the body. In other words, Buhl claimed

* Diseases of the Organs of Respiration. By Samuel West, M.A., M.D., F.R.C.P. Charles Griffin & Co., London. 1902.

† Laennec, traité de l'auscultation médiate, Paris, 1831, tome ii, p. 27.

that caseous material was infective in so far as different organs of the same human body were concerned.

Later on, Virchow and Niemeyer* expressed similar views.

But they sought to restrict the use of the term "tubercle" in a manner not in keeping with Laennec's view of unity.

It was perhaps somewhat significant that Laennec, while performing an autopsy upon a tuberculous subject, incurred a growth which he regarded as tuberculous on the forefinger of his left hand, which was accidentally scratched by a fragment of bone. It may have been this circumstance which gave rise to the belief, or at any rate stimulated inquiry into the inoculability of "tubercle."

Laennec himself, as is well known, died of phthisis, but as an interval of 20 years elapsed between the above accident and his death, the two events may not, as both Dr. Theodore Williams and Professor Osler point out, have been causally connected.

From the historical records it would appear that first attempts to induce tuberculosis by inoculation, at the end of the eighteenth and beginning of the nineteenth centuries, were not attended with very marked or decisive results. But Ponfick's discovery as to tuberculosis of the thoracic duct and the detection by Weigert of tubercle in the walls of veins in miliary tuberculosis were suggestive. Although Klencke in 1843 seems to have produced tuberculosis in a rabbit by the injection of tuberculous material from human miliary tuberculosis into the jugular vein, the significance of his observation was not apparently appreciated. The psychological moment had not seemingly arrived. But some twenty years later, *i.e.*, in the winter of 1865, when Villemin made his classical communication before the Academy of Medicine of Paris, the medical world was in a more receptive mood. Villemin had apparently been much impressed with the fact that Buhl, as already stated, had shown that pulmonary tuberculosis was, in the vast majority of cases, associated with the presence of caseous masses in other parts of the body, *i.e.*, he claimed to have demonstrated that this material was locally communicable or extensible.

Villemin selected for his experimental studies the rabbit and the guinea-pig, largely because "Il fallait, avant toute chose posséder un animal apte à devenir tuberculeux et le lapin, ainsi que le cochon d'Inde réalisent cette condition"; and he was able to produce tuberculosis in these animals by subcutaneous injection behind the ear of tuberculous material obtained from grey and yellow tubercles of human origin. Later he procured analogous results in rabbits with the sputum of phthisical persons.

It is of interest also to note that at that date he obtained very similar results by inoculating rabbits with tuberculous matter of

* Clinical Lectures on Pulmonary Consumption, by Felix von Niemeyer, M.D. Translated by C. Bäumler, M.D., New Sydenham Society, 1870.

bovine origin, and that the tuberculosis in this case was more pronounced in character than was that produced by the material of human origin. From the fact of his success with tuberculous matter of both human and bovine origin, Villemin inferred that they are identical; in fact, as Koch stated in *Mittheilungen aus dem Gesundheitsamte*, vol. II, 1884, Villemin "proved experimentally the identity of the latter disease (bovine tuberculosis) with human tuberculosis."

Certain of Villemin's experiments, which will be found fully set out in his *Etudes sur la Tuberculose*,* were obviously open to criticism, and it is needless to say that they did not escape it.

Similar work with varying results was carried on in Villemin's own country by Colin and Chauveau; in England by Simon,† Burdon-Sanderson, Andrew Clarke, Wilson Fox,‡ and Dawson Williams; and in Germany by Lebert, Waldenberg, Cohnheim, Fränkel, Salamonson, and others.

As regards the work of Chauveau, it deserves specially to be noted that in connection with more recent investigations to be referred to later on, he showed in 1868 that—

"Le tube digestif constitue, chez l'homme comme dans l'espèce bovine, une voie de contagion qui est des mieux disposée pour la propagation de la tuberculose et qui peut être bien plus souvent en jeu que la voie pulmonaire."

Cohnheim and Salamonson conceived the idea of working with the anterior chamber of the rabbit's eye, not only for the reason that in this medium all the changes could be observed day by day, but also because no cases of spontaneous tubercle of the iris were on record.

Not a few of the several experiments carried out by workers in different countries had led to confusion rather than elucidation of this subject of investigation, mainly owing to the fact that the material inoculated, whether tuberculous or non-tuberculous often produced a somewhat identical appearance, and in certain instances, more especially with the inoculations carried out by Feltz, of Strasburg, and Vogel, of Dorpat, the results were entirely negative.

But Dr. Dawson Williams who, at Dr. Wilson Fox's request, repeated certain of the experiments with non-tuberculous material, found that by exercising the greatest care against contamination by tuberculosis, entirely negative results as regards tuberculous appearances were obtained with non-tuberculous material.

* *Etudes sur la tuberculose; Preuves rationnelles et experimentales de sa spécificité et de son inoculabilité* par J. A. Villemin professeur agrégé à l'école impériale du Val-de-Grace, Paris. J. B. Baillière et Fils 1868.

† Tenth and eleventh Report of the Medical Officer of the Privy Council, 1867 and 1868.

‡ A Lecture on the artificial production of tubercle in the lower animals. Delivered at the Royal College of Physicians, May 15, 1868. "Lancet," XXI. and XXII., May, 1868.

Viewed by the light of the discovery not many years later of the tubercle bacillus, the explanation of these discrepancies of results is not far to seek.

Some of the above material, although derived from what were apparently "tubercles," did not contain the tubercle bacillus or contained that organism in a non-active condition. Moreover, there were not in those days any reliable tests for determining what was and what was not "tubercle." As matter of fact, Waldenburg, Cohnheim, and Fränkel were able to produce what they regarded as tuberculosis by introducing foreign bodies of sundry nature into the abdominal cavities of guinea-pigs.

But, in 1879, Cohnheim was led by the evidence which he had accumulated as a result of his experimental work to declare phthisis communicable, and in a sense to foretell the discovery of the bacillus, in these words :—

"All these facts speak, as it appears to me, so eloquently and decisively for the infectious nature of tuberculosis, that we are not shaken in this connection by the direct demonstration of the tubercular virus being up to the present time an unsolved problem."

In the "*Berliner Klinische Wochenschrift*" of April 10th, 1882, under the title of "*Die Aetiologie der Tuberculose*," Koch announced the discovery of the tubercle bacillus and the evidence upon which his claims were founded; and in *Mittheilungen aus dem Gesundheitsamte*, Vol. II., 1884, he set out fully the steps of his research.

In this paper, which was shortly afterwards translated for the Sydenham Society by Mr. Stanley Boyd, Koch states, and the utterance is of interest as indicating what at that date was the prevalent opinion of the medical profession in Germany as to the communicability of tuberculosis—

"Many practical men have no doubt kept in mind the possibility of infection, but with the medical profession generally phthisis is regarded as the result of constitutional peculiarities rather than of direct contagion."

In his search for the tubercle bacillus Koch adopted the same methods as those which he had employed in his investigation in connection with the micro-organism of anthrax.

In the first place, he was able by the use of a concentrated alcoholic solution of methylene blue, made alkaline with caustic potash to demonstrate the bacillus in miliary tuberculosis, pulmonary tuberculosis, phthisical sputum, the tuberculosis of various organs, and also in scrofulous glands and in lupus.

The bacilli in question were found by him not only in human tuberculosis, but in that of horses, swine, goats, sheep, fowls, monkeys, guinea-pigs, and rabbits. He then isolated the bacillus produced from cultures on solidified and sterilised blood serum, and by inoculation of tuberculous material, or of pure cultures of the bacillus, he was able to induce tuberculosis and to recover the tubercle bacillus which again cultivated in pure cultures induced disease in other animals.

In 79 guinea-pigs, 35 rabbits, and 4 cats he produced tuberculosis in every case. He was also able by spraying a solution holding tubercle bacilli in suspension into a large box containing rabbits, guinea-pigs, rats and mice to induce in these animals pulmonary tuberculosis.

These investigations established the fact that the particular cause of tuberculosis was a specific micro-organism having morphological, cultural, staining and inoculative characteristics which together rendered it possible to differentiate it from other acid-fast bacteria.

The tubercle bacillus when introduced into the body of certain warm blooded animals, whether by inoculation or (presumably) by inhalation, was capable of inducing in them the disease known as tuberculosis.

It was subsequently determined by other experiments, notably in this country by Klein and Heneage Gibbes, that there were certain differences between human and bovine tuberculosis. These two observers were also able later on to show that when guinea-pigs or rabbits were fed with tuberculous material of either human or bovine origin they shortly developed tuberculosis. It is of particular interest in this connection to recall the fact that Klein and Heneage Gibbes showed that in the case of rabbits, no matter whether the virus had been introduced by feeding or by inoculation, the lungs were among the organs earliest affected.

The communicability of tuberculosis having been proved, the circumstance that the specific bacilli were to be detected in large numbers in the sputum of persons suffering from pulmonary tuberculosis, had probably much to do with inference that the disease was also transmissible by means of infected sputum from man to man directly, and in the absence of inoculation or feeding.

Although, as will have been seen, Koch himself, as also subsequently Klein, found certain differences between the human and bovine tubercle bacilli, the belief became more or less general that they were nevertheless one and the same micro-organism.

This opinion was entertained by Chauveau, President of the Paris Congress on Tuberculosis in 1888, he having apparently arrived at this conclusion as a result of his own researches at the Veterinary School of Lyons.

At the Congress in question the following resolution was passed:—

“ That every means, including the compensation of owners, should be taken to bring about the general application of the principle that *all meat derived from tuberculous animals whatever the gravity of the specific lesions found in them should be seized and totally destroyed.*”

In England, early in the same year (1888) a Departmental Committee was appointed by the Lord President of the Council to consider, among other matters, the best method of dealing with

tuberculosis with a view to checking the progress of the disease among cattle, this Committee reported :—

“ That tuberculosis should be included in the Diseases (Animals) Acts for the purposes of slaughter and compensation for the seizure and slaughter of diseased animals exposed in markets or fairs.”

Also they recommended that in-breeding from animals known to be tuberculous should be prohibited. About this time, too, experiments were being carried out under the auspices of the Veterinary Department of the Privy Council, and the records thereof are to be found in the annual report of that Department for the years 1890 and 1891. These experiments tended to show that when tuberculous meat was dealt with in the usual fashion as regards trimming, &c., and administered to healthy animals, a large percentage of such animals became tuberculous ; and it was also shown that the risk from the consumption of such meat was not always rendered harmless by cooking operations.

But the want of administrative uniformity in different parts of the country in the matter of seizure and condemnation of carcases affected with tuberculosis became so great that the Government in July, 1891 appointed a Royal Commission, of which the Right Honourable Lord Basing, F.R.S., was chairman. The Commission was “ to inquire and report what is the effect, if any, of food derived from tuberculous animals on human health ; and if prejudicial, what are the circumstances and conditions with regard to the tuberculosis in the animal which produces that effect upon man.”

This Commission, which on the death of Lord Basing, was reconstituted in 1894 under the Chairmanship of Sir George Buchanan, F.R.S., examined many witnesses and secured the services of Sir John Macfadyean, Dr. Sidney Martin, and Professor Sims Woodhead to conduct certain researches on definite pre-arranged lines. On April 3, 1895, the Commission reported :—

“ We have obtained ample evidence that food derived from tuberculous animals can produce tuberculosis in healthy animals. The proportion of animals contracting tuberculosis after experimental use of such food is different in one and another class of animals ; both carnivora and herbivora are susceptible, and the proportion is high in pigs. In the absence of direct experiments on human subjects, we infer that man can also acquire tuberculosis by feeding upon materials derived from tuberculous food animals.

“ The actual amount of tuberculous disease among certain classes of food animals is so large as to afford to man frequent occasions for contracting tuberculous disease through his food. As to the proportion of tuberculosis acquired by man through his food or through other means, we can form no opinion, but we think it probable that an appreciable part of the tuberculosis that affects man is obtained through his food.”

As regards risk from the consumption of tuberculous meat and milk respectively, the Commissioners state, “ Any person who takes tuberculous matter into the body as food incurs risk of acquiring tuberculous disease ;” and “ No doubt the largest part of the

tuberculosis which man obtains through his food is by means of milk containing tuberculous matter." And they quote Dr. Sidney Martin to the effect that "The milk of cows with tuberculosis of the udder possesses a virulence which can only be described as extraordinary."

The conclusion arrived at by this Commission called for more stringent administrative measures than obtained at that time, and in 1896 another Royal Commission was appointed to consider this aspect of the question. In their report, issued in 1898, the Commissioners laid stress upon the fact that "no proof had been forthcoming that tubercle bacilli had even been detected in milk unless drawn from a cow with tuberculosis of the mammary glands."

As a consequence the Dairies, Cowsheds, and Milkshops Order of 1899 was extended so as to embrace "such diseases of the udder as shall be certified by a veterinary surgeon to be tubercular." The effect of this Order was to prohibit milk derived from cows certified to be thus affected from being mixed with other milk or be sold or used for human food.*

The Commission, while making certain recommendations limiting condemnation of the carcasses of tuberculous cattle, expressed the view that the tendency of tuberculosis towards generalisation in pigs required that any tuberculous deposit in these animals should lead to the condemnation of the whole carcass.

Adoption of administrative measures on these lines received a check in 1901 when, at the Tuberculosis Congress held in London

* Since that date much work upon the subject of this infectiousness—for guinea-pigs—of milk derived from tuberculous cattle has been carried out both in this and other countries, and in 1903, Mohler, Chief of the Pathological Division of the Bureau of Animal Industry of the United States Department of Agriculture, who had carried out an extensive investigation relative to the infectiousness of milk of cows which had reacted to the tuberculin test summarised the position at that time as follows :—

1. The tubercle bacillus may be demonstrated in milk from tuberculous cows when the udder shows no perceptible evidence of disease, either macroscopically or microscopically.
2. The bacillus of tuberculosis may be evicted from such an udder in sufficient numbers to produce infection in experimental animals both by injection and inoculation.
3. That in cows suffering from tuberculosis the udder may, therefore, become affected at any moment.
4. The presence of the tubercle bacillus in the milk of tuberculous cows is not constant, but varies from day to day.
5. Cows secreting virulent milk may be affected with tuberculosis to a degree that can be detected only by the tuberculin test.
6. The physical examination or general appearance of the animal cannot foretell the infectiousness of the milk.
7. The milk of all cows which have reacted to this tuberculin test should be considered as suspicious, and should be subjected to sterilization before using.
8. Still better tuberculous cows should not be used for general dairy purposes.

in that year, Professor Koch announced, in an address* which has for many reasons become historical, that he felt "justified in maintaining that human tuberculosis differs in important respects from bovine tuberculosis and cannot be transmitted to cattle," and he added, "It seems to me very desirable, however, that these experiments should be repeated elsewhere, in order that all doubt as to the correctness of the assertion may be removed."

With regard to the communicability of bovine tuberculosis to man, he expressed himself in the same address as follows :—

"Though the important question, whether man is susceptible to bovine tuberculosis at all is not yet absolutely decided, and will not admit of absolute decision to-day or to-morrow, one is nevertheless at liberty to say that if such a susceptibility really exists the infection of human beings is but a very rare occurrence. I should estimate the extent of infection by the milk and flesh of tubercular cattle and the butter made of their milk as hardly greater than that of hereditary transmission, and I therefore do not deem it advisable to take any measures against it."†

The effect of Professor Koch's dramatic statement at a Congress whereat papers dealing with the control of tuberculous milk and meat were to be read will not easily be forgotten by those present. Obviously if Professor Koch's inferences from the series of experiments conducted by himself and Professor Schütz of the Veterinary College in Berlin were sound, an enormous amount of tuberculous milk and meat had in the past been wasted in all parts of Europe. The *Lancet*,‡ for instance, asked why, upon Professor Koch's thesis, "we should not consume such tubercle-riddled udders and give to our children milk drawn from similar sources." "Is it, too," the *Lancet* inquired, "established beyond a doubt that pulmonary tuberculosis is always air-borne?"

Lord Lister, who occupied the chair on the occasion of the address given by Professor Koch, urged need for caution in accepting the proffered inferences; adding, "it is a serious

* Transactions of the British Congress on Tuberculosis, 1901. Vol. I. William Clowes & Sons, London.

† In the communication in which in 1884 Professor Koch set forth the steps by which he discovered the tubercle bacillus, the following passage taken from Mr. Stanley Boyd's translation in the Transactions of the Sydenham Society (vol. cxv.) occurs :—

"But when we consider that by inoculation of the most different kinds of animals (cats, rabbits, guinea-pigs, field mice) with pearl nodules and the pure cultures proceeding from them, a disease is produced with the greatest regularity, which exactly resembles in its anatomical features the disease occurring in these animals as the result of inoculation with tubercular material, and which just as certainly leads to the death of the animals, we cannot imagine that man is an exception with regard to this pathological poison. So that if it should be proved in the course of further researches there is any other difference between the bacilli of tubercle and *perlsucht* which would compel us to regard this as nearly related, we should then, nevertheless, have every cause to consider the *perlsucht* bacilli as in the highest degree suspicious. From a hygienic point of view, the same precautions must be adopted against this as against infection by tubercle bacilli until it is proved that in the human being *perlsucht* bacilli may with safety be brought into contact with wounds of the skin, and that they or their spores can be inhaled or swallowed without giving rise to tuberculosis."

‡ *Lancet*, July 27th, 1901, p. 217.

matter if the conclusion be wrong." Also he foreshadowed in a remarkable fashion the results of later investigations, pointing out that if it were found that a considerable percentage of children present tubercle in their mesenteric glands, with or without intestinal lesions, as the sole manifestation of their original tubercular disease, he would be disposed to accept this "interpretation that the tubercle bacillus passes through the intestinal wall without producing a distinct lesion of the mucous membrane, just as we know may occasionally be the case in typhoid fever." Caution in accepting Professor Koch's inferences was also enjoined by Nocard of Alfort, Bang of Copenhagen, and Sims Woodhead of Cambridge.

Papers read by Professor Ravenel, of Philadelphia, and others at this Congress also furnished data inconsistent with Professor Koch's thesis. Professor Ravenel, for instance, recorded three cases of infection of man by tubercle of bovine origin, and at the conclusion of a very valuable paper read by him on "The Comparative virulence of the Tubercle Bacillus from Human and Bovine Sources," he expressed the opinion that "it is a fair assumption from the evidence at hand, and in the absence of evidence to the contrary, that the bovine tubercle bacillus has a high degree of pathogenic power for man also, which is especially manifest in the early years of life."*

But the weight of Professor Koch's pronouncement was so great that a State appointed tribunal was regarded as called for, and on August 21st, 1901, a Royal Commission with the late Sir Michael Foster, M.P., K.C.B., F.R.S., as its chairman, was appointed

To inquire and report with respect to tuberculosis :—

1. Whether the disease in animal and man is one and the same.
2. Whether animals and man can be reciprocally infected with it.
3. Under what conditions, if at all, the transmission of the disease from animal to man takes place and what are the circumstances favourable or unfavourable to such transmission.

Nevertheless, and in view of Koch's dicta, considerable difficulties arose in the administrative control of meat and milk derived from tuberculous carcasses and cattle respectively. The Commission therefore issued on May 16th, 1904, an interim report† in which it was stated that taking twenty different "strains" of tuberculous material of human origin for the purpose of ascertaining their effects as compared with

* See also "L'inoculabilité de la tuberculose humaine et les idées de M. Robert Koch sur cette tuberculose et la tuberculose animale," par M. S. Arloing. Bulletin de l'Académie de Médecine, Tome XLVI.

† Interim Report of the Royal Commission appointed to inquire into the relations of Human and Animal Tuberculosis, 1904. [Cd. 2092.]

tuberculous material of bovine origin, it was found that the introduction into cattle of seven of the twenty human strains led to the development of widespread disease in various organs, and that in some instances the disease was of remarkable severity. In the case of the remaining thirteen "strains" the bovine animal was affected to a less extent. In regard to these thirteen the Commission stated that

"The tuberculous disease was either limited to the spot where the material was introduced (this occurred, however, in two instances only and these at the very beginning of our inquiry) or spread to a variable extent from the seat of inoculation along the lymphatic glands with, at most, the appearance of a very small amount of tubercle in such organs as the lungs and spleen. Yet tuberculous material taken from the bovine animal thus affected and introduced successively into other bovine animals or into guinea-pigs from which bovine animals were subsequently inoculated, has, up to the present in the case of five of these remaining strains, ultimately given rise in the bovine animal to general tuberculosis of an intense character; and we are still carrying out observations in this direction."

Here then was a series of experiments which yielded very different results to those yielded by the experiments of Koch and Schütz. In so far indeed as any conclusions are to be drawn from them, they would appear to point to inferences diametrically opposed to those of Professor Koch.

The Commission further noted, as regards the question of the identity of the human and bovine bacillus, that they had so far failed to discern any character by which one could be distinguished from the other, and that records of their researches contained "accounts of the post-mortem examinations of bovine animals infected with tuberculous material of human origin which might be used as typical descriptions of ordinary bovine tuberculosis." And while postponing the publication of the details of their researches they conclude thus:—

"Meanwhile we have thought it our duty to make this short Interim Report for the reason that the result at which we have arrived, namely, that tuberculosis of human origin can give rise in the bovine animal to tuberculosis identical with ordinary bovine tuberculosis seems to us to show quite clearly that it would be most unwise to frame or modify legislative measures in accordance with the views that human and bovine bacilli are specifically different from each other, and that the disease caused by the one is a wholly different thing from the disease caused by the other."

In the spring of 1905 a report was issued by the German Kaiserlichen Gesundheitsamte (Imperial Board of Health) upon the work which had been carried out since 1902, the more important conclusions arrived at being as follows:—

(a) Among mammalian tubercular bacilli there was a *typus bovinus* and a *typus humanus*. (b) That in human tuberculosis tubercular bacilli of the *typus humanus* were, in most cases, discovered, but that tubercular bacilli of the *typus bovinus* were found in a small proportion of cases of human tuberculosis. (c) The cases examined in which the infection had been caused solely by tubercular bacilli of the *typus bovinus* concerned children under seven years of age and they almost exclusively presented symptoms which pointed to the conclusion that infection had taken place via the intestines. (d) In one case of intestinal

tuberculosis in a woman of thirty years of age, tubercular bacilli of the *typus bovinus* were found in the mesenteric glands together with bacilli of the *typus bovinus*. (e) With the exception of one case all the tuberculous bacilli of the *typus bovinus* discovered in human beings were obtained from the mucous membrane of the intestines or of the mesenteric glands which had undergone tuberculous changes. (f) The researches lent no support to the view that bacilli of bovine origin exercised a stronger disease-producing power than those of human origin, nor did they confirm the belief that transformation of the tubercular bacilli of the bovine type into bacilli of the human type takes place as the result of long existence of the former in the human body.

It may be added, too, that at the International Tuberculosis Congress which was held in Paris in October, 1905, the following resolution was adopted :—

The Congress declares that it is not only indispensable to avoid the contagion of tuberculosis from human beings, but that it is also necessary to secure the prevention of bovine tuberculosis in continuing to take administrative and hygienic measures against the possible communication of bovine tuberculosis to the human species.

But notwithstanding the conclusion of the English Commission an opinion still prevails in the medical profession that tuberculosis of the human subject, whatever its degree, is due in the main to the drying of infected sputum and to the inhalation of dust thus infected. And this would appear to be the opinion strongly held by Professor Koch, who, apparently, still adheres to the views expressed in his London address. This dust-borne thesis rests very largely upon certain experiments conducted by Koch and Cornet in Germany, and since supported by observers, such as Coates and Swithenbank, in this country.

It, has, however, to be pointed out that Cornet's researches and conclusions have been seriously challenged by more recent workers; so that opinion on the method of transference of phthisis from man to man may be regarded as divided into two schools, the one led by Cornet, the other by Flügge.

The school of Cornet holds, as has been said, that in so far as human sources of infection are concerned the danger is to be attributed to the tubercle bacillus contained in the *dried* sputum of phthisis. So long as the sputum is retained in a moist condition the danger is but slight; if it be allowed to dry the danger is thought of as materially increased.

The tubercle-bearing sputum, when dry, is, the school of Cornet teaches, wafted about inhabited rooms by currents of air, finally lodging upon the walls and floors of dwellings and workshops, the dust on all of which may, it is inferred, become thereby more or less indefinitely infected. In the course of dry "dusting" the infected dust is disturbed and being perchance inhaled by persons with proclivity towards tuberculosis, may produce pulmonary consumption in them by direct entrance into their air passages.

In almost direct contradiction to these views is the teaching of the school with which the name of Flügge is mainly associated. This school claims that its experimental work points to the conclusion that the main danger of contracting phthisis within doors

is to be anticipated not from dust but from the numerous droplets of saliva thrown off from the respiratory tract during expulsive efforts of the phthisical patient, such as coughing, sneezing, and loud or excited speaking. By exposing Petri dishes in a glass chamber in different positions both before and behind a consumptive patient seated therein, it was found by Heymann that after fits of coughing tubercle bacilli had lodged in 70 per cent. of the dishes situated in front and behind the patient.

The experiments were repeated, the patient being in each instance told to hold his handkerchief before his mouth when in the act of coughing. Petri dishes in this case only yielded 30 per cent. of positive results, and Heymann thinks that if the handkerchief were used in an intelligent fashion a much greater reduction might be effected.

The results of further experiments, conducted to determine for what length of time droplets ejected during coughing tended to remain suspended in the atmosphere of the chamber, showed that they speedily settled down. It was also found that tubercle bacilli thus extruded perished within 18 days in the dark, and within three days when exposed to sunlight.

Other experimental work in this connection went to show that tubercle-laden dust deposited upon walls, &c., were not so easily detached and suspended again in air as the observations of Cornet seemed to indicate, and Heymann thinks that the application of a moist sponge to a wall with the view of detaching bacteria, which was practised by Cornet, is not a fair criterion of what takes place in everyday life. It seems, too, not improbable that sputum-fouled handkerchiefs do not, as a rule, dry so rapidly as has been believed; indeed, certain experiments recently carried out suggest that if a clean handkerchief be taken every 12 hours and the foul handkerchief be properly dealt with, there should be but little danger from this source.

In reference to this phase of the question, it may be pointed out that the ability of the tubercle bacillus to retain its virulence under ordinary everyday conditions until the sputum containing it becomes so dried as to render practicable its diffusion as dust is, according to a large amount of experimental work, an improbable event. Ransome* and Delepine found, as the results of experiments conducted by them, that the time necessary to bring about the death of the bacillus when exposed to light and air was in every case less than would be necessary to reduce the sputum to dust. Dr. Ransome, moreover, points out that the test by the inoculation of guinea-pigs which was employed in the series of investigations upon which the conclusions of himself and Delepine were based, was the most severe one which could be devised, seeing how marked is the susceptibility of these rodents to tuberculosis; and he goes on to state that human beings may

* "Researches on Tuberculosis"—The Weber-Parkes Prize Essay, 1897; by Arthur Ransome, M.D., F.R.S. See also Proceedings of the Royal Society, Vol. LVI.

be expected to prove much less susceptible to infection through the lungs than are guinea-pigs by inoculation.

Dr. Ransome infers from these experiments that finely divided tuberculous matter, such as pure cultivations of the bacillus or tuberculous matter derived from sputum, is speedily deprived of its virulence in daylight and in free currents of air. He and his colleague maintain, too, that since tuberculous sputum exposed to sufficient light and air suffices speedily to deprive it of virulence before it can be dried up and pulverised, danger of infection from this source need not be contemplated.

It was found, however, by these observers that in the presence of organic matter given off by the lungs and in the absence of light and air the bacillus could retain its power, as measured by inoculation experiments, for several days.

These experiments of Ransome and Delepine, carried out several years ago, hardly seem to-day to be receiving the attention which they deserve. They have, however, recently been confirmed in a remarkable manner by Professor Cadéac of the Veterinary School of Lyons, whose record of researches will be found in the November (1906) number of the *Revue d'Hygiene et de Police Sanitaire*. Cadéac investigated the vitality of the sputum-held tubercle bacillus; (a) in light, (b) in darkness, (c) on absorbent, and (d) on non-absorbent materials. He found that the drying of the sputum took place very slowly, and that its conversion into dust was neither as simple or as easy as has been believed. In natural light in a room the sputum took 10 to 12 days before it became so dried as to enable it to be easily detached, and by inoculating guinea-pigs with samples of the sputum from time to time, it was found that at the end of four days there was one positive and one negative result. A like result occurred after six days, but in this instance the lesions in the successful case were extremely discrete. At the end of 10 days the guinea-pigs inoculated peritoneally with the collected dust suspended in filtered and distilled water yielded a negative result. Dust of the same character was insufflated into a box containing four guinea-pigs, and after the completion of the experiment one of the guinea-pigs ate the greater part of the remaining dust which had been carefully collected. Three months later the guinea-pigs which had only inhaled the dust were found to be quite healthy, while the fourth which had ingested as well as inhaled dust presented characteristic lesions of ingestive tuberculosis.

Thus it was found generally that the destruction of virulence of the sputum-retained bacillus was more or less rapid, according to the intensity of light and the thickness of the expectoration.

The whole of Cadéac's researches are, he claims, very far from supporting the view that tuberculosis spreads by the inhalation of tuberculous dust. He concludes that drying and loss of virulence of tuberculous sputum proceeds side by side, and that removable dusts are inert dusts.

But Cadéac's investigations as regards the danger of "droplets" of saliva of phthisical persons yielded very different results. Working with Malet in 1887, he showed the virulence of such liquid particles, and he refers to the experiments of Preyse, who found that a milligramme of tuberculous sputum, containing about 40 tubercle bacilli, could sometimes give rise to tuberculosis by the inhalation of liquid particles, while the inhalation of doses three or four times stronger invariably produced the disease.

More recent experiments carried out by Cadéac would seem to have entirely confirmed his previous researches. Both with rabbits and guinea-pigs he obtained a large number of positive results, more particularly, perhaps, with guinea-pigs. On July 16, 1906, he submitted 20 guinea-pigs to the inhalation of 175 grammes of sputum suspended in a litre of distilled water, and at the autopsy on October 26 all were shown to be tuberculous in a high degree. But, and the significance of this point will become shortly apparent, their tuberculosis resembled much more a tuberculosis of ingestion than a tuberculosis of inhalation.

Cadéac's later work must be regarded as confirming that of the school of Flügge, and it would appear to justify the conclusions arrived at by Cadéac in 1887, when he wrote :—

"The respiratory passages are very favourable to the development of tuberculosis when the bacilli which penetrate to their interior are suspended in liquid, but these organisms infect them on the contrary with difficulty and rarely when they are incorporated in dust."

In connection with these conclusions, it may be observed that Koch himself obtained highly successful results by means of spray in a series of experiments to which reference has already been made. Koch, however, has regarded the main danger of infection to lie rather with infected dust than with droplets.

It is now necessary to turn to another phase of the tuberculosis problem.

On September 26, 1903, *Professor Von Behring, of Marburg, delivered an address before the Natural History and Medical Society of Cassel, in which he enunciated a theory which, if true, or even partially true, should have a profound effect on administration in control of tuberculosis. Having drawn attention to the enormous prevalence of tuberculosis, as evidenced by post-mortem records upon the human species, Von Behring states :—

"I must confess to you that hitherto, according to my opinion, there has nowhere been brought forward an unassailable proof of consumption in the case of an adult arising from tubercular infection originating epidemiologically, i.e., under the conditions of infection existing in nature."

* *Dtsch. Med. Wchsche*, No. 30, 24th September, 1903, and "Tuberculosis" (yellow), Vol. II., No. 11.

He discredits cases of alleged dust-borne infection by the theory that the widespread nature of the disease renders it probable that a very large number of persons are already the bearers of a latent tuberculosis.

In Von Behring's view, consumption is usually communicated to the child through the bovine milk on which it is nourished. His grounds for this view are his researches which he claims have demonstrated that the permeability for bacteria of the intestinal membrane in infants enables all milk-borne bacteria to pass through into the blood. There is, in his opinion, a fundamental difference between the permeability of the intestinal membrane in infancy and in later age owing to the fact that the new-born infant has no connected epithelial covering over the mucous membrane, and that its self-protecting forces are as yet wholly or almost undeveloped.

In his view, the bacilli having entered the system, remain in a large number of cases latent until puberty; exhausting confinements, "colds," or other debilitating processes rendering the body prone to the attacks of the latent bacilli.

Von Behring does not deny the influence of human infection, in so far as it may be instrumental in infecting milk given to the young; but he regards the bovine source of the disease as by far the major danger. He recognises, too, the advantages of the temporary sojourn of tuberculous subjects in sanatoria, as by this means their resistance may be increased, and they may learn in what manner to lead wholesome lives.

As Dr. Muller, of Königsburg, has figuratively expressed Von Behring's attitude in the "Journal of Comparative Pathology and Therapeutics" (Vol. XX., part 1, March, 1906): Human pulmonary tuberculosis is, he says "merely the end of the song which was sung to the young consumptive in the cradle; in other words, that pulmonary phthisis is the typical end of a chronic epizootic tuberculous infection contracted in infancy."

In connection with this aspect of tuberculosis, reference may be made to Chapter IV., page 100, where a summary is given of some interesting investigations made by Dr. F. Mott, F.R.S., as to the reawakening of obsolescent tuberculosis in persons who have become insane.

It cannot be said that Von Behring's thesis has received general acceptance; indeed at the Berlin Medical Society it was strongly opposed by Fränkel and Baginsky—more especially as regards that side of it which attributes infection to milk of bovine origin. Notwithstanding the great authority and influence of the Marburg Professor, the air-borne view of infection still claimed almost general adherence.

It should be mentioned in connection with this phase of the controversy as to the relation between human and bovine tuberculosis that Dr. Nathan Raw, of Liverpool, claimed, in 1903, to have isolated *bovine* bacilli from the mesenteric glands of a child

suffering from primary abdominal tuberculosis, and he has further expressed the opinion that surgical tuberculosis is the result of the ingestion by children of bovine bacilli contained in milk and other foods.*

At about the time of the Paris Tuberculosis Congress of 1905, other evidence, sometimes differing, sometimes harmonising with Von Behring's views, was brought to light.

One of the most important of these was a communication to the Congress by Professor H. Vallée, the successor of the deeply regretted Nocard at the National Veterinary School at Alfort. In a series of experiments directed to determining the relative facility of infection by the air passages and by the intestinal tract, Vallée obtained results which, in his view, justify the conclusion that, although tuberculosis can invade the organism *via* the nose or the bronchi, the most easily traversed route is by way of the intestines. In Vallée's view the tubercle bacillus is able to pass through the walls of the intestines without producing appreciable lesions of the mucous coat or subsequently of the mesenteric glands. Having thus escaped from the intestine it passes, he thinks, by way of the lymphatics and infects the bronchial glands, for which it has a distinct predilection.

Vallée concludes that we are no longer able to regard human tuberculosis of intestinal and alimentary origin as relatively rare, but that in view of the evidence adduced it must be held that pulmonary tuberculosis frequently arises from the swallowing of tuberculous dust or infected and imperfectly cooked foods. The researches of Rabinowitch, Mohler, and Moussu, which have demonstrated the virulence of the milk of certain cows attacked with visceral tuberculosis without any lesions of the mammary glands, show, says Vallée, like his own investigations, the necessity for a *strict sanitary control of milk production*.

At the same Congress, a communication equally significant was presented by Calmette and Gervais, of the Pasteur Institute at Lille. Here the animal employed for experimental purposes was the goat, which was selected on account of its well-known resistance to tuberculosis. One of the most important results of these investigations was to show that, *adult* goats fed by means of an œsophageal tube with fresh bovine tuberculous material finely triturated and diluted with a small quantity of sterile water, contract a severe pulmonary tuberculosis rapidly fatal, the animals showing after death no intestinal tuberculous lesions. These series of experiments also showed, in so far as *young* goats were concerned, that contrary to the views of Von Behring in relation to the human subject, *adult* goats contracted pulmonary tuberculosis more easily by the intestines than did *young* goats.

* *Lancet*, March 7th and August 15th, 1903.

See also "Annales de l'Institut Pasteur," October, 1905 (Masson & Co., Paris), and "Tuberculosis" (German), Vol. V.

More recently, at the Hague Conference, in the autumn of 1906, Calmette brought forward another contribution* upon the subject, in which he referred to the experiments carried out by himself and Guérin, at the end of 1903, with goats, and later on young and adult bovine animals, and also to the experiments which he conducted with Maurice Breton on rodents. These experiments all point, in his view, to the conclusion that the intestinal tract of the adult animals experimented upon permits the passage of the tubercle bacillus far more easily than does that of young animals of the same species, and he infers from these experiments that the same is the case with the human species. Consequently he found himself at variance with Von Behring in the view that "la tuberculose pulmonaire de l'adulte résulterait de l'évolution tardive d'une infection intestinale contractée dans le jeune âge."

Calmette referred to the great difficulty which he and Guérin had experienced in inducing pulmonary tuberculosis by inhalation, and to the manner in which his results in this particular differed from those obtained by Cornet, Flügge, Cadéac, Nocard and Rossignol; in fact, Calmette would appear to raise serious doubt as to the part played both by tuberculous dust or tuberculous droplets in inducing tuberculosis by inhalation.

He is, on the other hand, satisfied with Vansteenberghe and Grysez, that pulmonary anthracosis cannot be produced by causing animals to respire in an atmosphere of black smoke, provided that such animals are precluded from swallowing the blacks which have accumulated in the nasal cavity and in the pharynx. The characteristic lesions appear, however, very quickly when the soot is introduced either by an œsophageal tube or mixed with food. Similarly, he has found that it is practically impossible to infect the lungs directly by inhalation, by intra-tracheal insufflation, or by direct inoculation into the trachea; he was unable to introduce the bacilli beyond the first bronchial ramifications.

In Calmette's view, instances of alleged air-borne tuberculous infection of the lungs have been instances of infection *viâ* the intestines, no precautions having been taken to prevent contaminated dust in the pharynx from being swallowed with the saliva. On the other hand, where goats or bovine animals, young or adult, have been made to ingest a repast, of bovine tuberculosis by the aid of the œsophageal tube, there ensues in all cases at the end of from 30 to 45 days peripheral tubercle under the pleura especially localised at the apices and near the front of the two lungs, and peribronchial tubercles near the final ramifications of the lobular bronchioles.

In a word, Calmette regards it as established that pulmonary tuberculosis arises from infection through the digestive canal, the

* See *Revue d'Hygiène et de Police Sanitaire*, Tome XXVIII., No. 8. August, 1906, and *Tuberculosis* (German), Vol. V., No. 10.

tuberculous processes beginning in the capillaries of the lung, especially in the finest ramifications which traverse the very dense connective tissue of the pleural surface or the lobular bronchi. In his view intra-alveolar or intra-bronchial tuberculation only occurs secondarily by reason of the prolapse of tubercles in the alveoli or in the bronchi. Pulmonary tuberculosis, in Calmette's view, depends largely upon the ability of the mesenteric glands to intercept the bacilli, and this they are far more likely to do in the young than in the adults, in which the pulmonary lesion may occur almost at once.

Calmette's work confirms in one way, but confutes in another, the conclusions of Von Behring. Both observers are in agreement as regards belief (in each case very largely on the basis of his own experiments) that by far the most important sources of pulmonary tuberculosis is ingested tuberculous material. But Von Behring believes that tubercle of bovine origin is the greater factor. Calmette holds that the greater danger is to be feared from human tuberculosis. Both agree that each of the two factors probably plays some part. In Von Behring's view, the intestinal tract is especially permeable in the young. Calmette, on the other hand, thinks such permeability greatest in adults.

With Von Behring, infection in the majority of cases is taken in during childhood and remains latent until health-depression of one or another type renders the host extra-susceptible; with Calmette, latency in this sense is a minor factor, the intestines being permeable at all ages, but more particularly in adults. Both are in agreement that precautions should be taken against tubercle of both bovine and human origin.*

* It may be mentioned that Calmette apparently looks forward with hope to the production in the human species of immunity against tuberculosis by means of preventive inoculation, and the experiments which he has carried out with Guérin upon calves afford, it appears, the basis of his hopes. These experiments went to indicate that calves which had been made to ingest a single repast infected with tubercle bacilli of bovine origin reacted to the tuberculin test for a period of from two to four months, and then suddenly ceased to react. If these calves were killed only small cicatrices were visible on the surface of their lungs, and their mesenteric or bronchial glands inoculated into guinea-pigs produced no tuberculosis in these animals. The calves thus recovered from tuberculosis could not be infected by means of a fresh dose of tubercle bacilli taken during a meal. They had, it is claimed, acquired an immunity, and had to be regarded as vaccinated against tuberculosis. When, however, other calves were fed by tuberculous infected repasts at frequent intervals, or fed with milk coming from a tuberculous cow, such calves developed a rapid tuberculosis showing no natural tendency towards recovery. At the autopsies made at the end of two or three months, more or less extensive pulmonary and glandular lesions were found with caseating tubercles. In the light of these data Calmette thinks that it is easy to comprehend why human beings recover so frequently from an attack of tuberculosis. Why is it, for instance, that children with tuberculous glands recover in such a surprising fashion when placed in marine sanatoria and remaining free from all sources of reinfection? They have, it is claimed, had time to recover from their first attack before being exposed to a fresh infection.

Some support, too, has been afforded to Von Behring's thesis by the work of Professor G. Schlossmaur and Dr. Engel, a record of which appears in the *Deutsche Med. Wochenschrift*, 1906, No. 27. These observers found that pieces of the lungs of guinea-pigs, into whose stomachs an emulsion of tubercle bacilli had been carefully injected a few hours previously, yielded tuberculosis when inoculated into other guinea-pigs. The authors think that the bacilli easily leave the mesenteric lymphatic glands, and being carried into the thoracic duct, reach the lungs through the right side of the heart and the pulmonary artery.

Apart from the above experimental evidence pointing to the conclusion that possibly the alimentary tract may eventually be shown to be the chief channel of infection of the system by the tubercle bacillus, there are, as Dr. Lawrence Flick, of Philadelphia,* has pointed out, certain *a priori* grounds for this view. As he succinctly puts it—

"The alimentary canal is the natural channel for the entrance of all solids, and it is so constructed as to facilitate their entrance. That the tubercle bacillus can speedily and conveniently get into the circulation by way of the alimentary canal and the thoracic duct cannot be doubted from a physiological point of view, and has been amply demonstrated experimentally by Gerlach, Ravenel, and others. The bacilli are taken up by the lacteals of the intestines and carried through the right heart into the circulation. Once in the circulation they find the place of least resistance in the body and colonise there. This explains many phenomena in the development of tuberculosis which otherwise are unintelligible. Among other things it explains why the primary seat of tuberculosis may be in any part of the body which is reached by the circulation. It also makes intelligible the frequency with which the lungs are the primary seat of the disease, inasmuch as the lungs act as a sieve for the contents of the thoracic duct before these go into the general circulation."

It is, however, not improbable that much of the glandular tuberculosis of children may be of tonsillar, pharyngeal, or nasal origin, the infection being sometimes carried from foci in these situations to the submaxillary and bronchial glands, and thence to the lungs. As Professor Hueppe† pointed out in 1903:—

"The tuberculosis of the lymphatic glands of children, the so-called scrofula, is perhaps never caused by inhalation, but by nutrition with tubercle-containing material. In severe cases it is possible, as stated by Volland, that a direct contagion can be produced by dirty fingers of children, especially when they play on the ground. In such infected lymphatic glands the tubercle bacilli may remain latent for some years. The source of tubercle material in children is, in my opinion, generally infected milk, and certainly most frequently the milk of cattle with pearly disease."

Professor Delepine‡ has found experimentally that a single prick of the tongue of a guinea-pig with a needle loaded with

* "The way of Infection in Tuberculosis." A paper contributed to the Hague Conference of 1906.

† "Tuberculosis." Harben Lectures for 1903; by Frederick Hueppe, M.D., Professor of Hygiene in the German University of Prague.

‡ (a.) Tuberculosis infection through the alimentary canal.

(b.) "Tuberculosis and Acute Miliary Tuberculosis," by Prof. D. G. Cornet, of Berlin. Nothnagel's Encyclopedia of Practical Medicine. English Edition. W. B. Saunders & Co.: London, 1904.

tubercle bacilli may be followed by marked tuberculosis of the cervical ganglia, the lesion in such a case resembling closely those observed in the neck of scrofulous children, and Cornet claims that after inoculation of the skin, cheeks, nose, &c., of guinea-pig or rabbit with tuberculous sputum there occur swelling and caseation of the cervical and bronchial lymph glands, first of the same then of the opposite side, followed by tuberculous formations in the lungs, and eventually also in the spleen and liver. Cornet also states that after inoculation of tubercle in the internal pockets of the mouth, the submental, sublingual, and cervical glands, more especially of the side inoculated, became cheesy, and the results were similar after inoculation of the tonsils, posterior pharynx, and tongue.

Dr. Arthur Latham, in an investigation directed to determine the presence of tubercle in the tonsils of children, found by inoculation of rodents that tuberculosis was present in seven cases out of forty-five in children between 5 months and 15 years of age not suspected to be tuberculous, and in whom the tonsils had been removed or were examined after death.

Similarly, Dr. Hugh Walsham,* discussing this subject in his Weber-Parkes Prize Essay, thus quotes Professor Sims Woodhead.

"I am driven to the conclusion that this method of infection of the glands of the neck through the tonsils must be a comparatively frequent occurrence, especially in children living under insanitary conditions and subjected to various devitalizing influences."

Calmette does not deny that, especially with infants, infection can take place by the rhino-cervico-mediastinal lymphatics, but he thinks that when the bacilli invade the organism by this route, or by the lymphatics of the skin, or by those of the mucous membranes, there is probably already existing a non-tuberculous lesion which affords a gate of entry. The bacilli, free on a superficial healthy tissue, are, he considers, unable to traverse it, but they penetrate easily by direct absorption with the nutritive particles of the chyle between the cellular epithelium of the intestines.

Since the foregoing observations were written the second interim report of the Royal Commission on Tuberculosis† has been issued, and the matters dealt with in that report form an instructive corollary to the historical account contained in this chapter. The Commissioners have as yet by no means completed the task imposed upon them by their reference, but the conclusions at which they have already arrived have a very important bearing upon some of the problems already discussed. It is, too, possible that these results when the investigation is

* The Channels of Infection in Tuberculosis, by Hugh Walsham, M.A., M.D., Camb., F.R.C.P., London, John Bale, Sons and Danielsson, 1904.

† Second Interim Report of the Royal Commission appointed to inquire into the relations of Human and Animal Tuberculosis. Printed for His Majesty's Stationery Office by Wyman & Son, Fetter Lane, E.C., 1907. [Cd. 3322.]

carried further may lead to a still greater modification of generally accepted beliefs.

It may be well to develop this point a little before giving the definite conclusions which the Commissioners feel themselves now able to announce. As regards human tubercle bacilli, the Commissioners have been led by their investigations to divide them into three groups. The members of Groups I. and II., are clearly marked off from one and another by characteristics sufficiently distinct, but in Group III., there are found types, some of which approximate in character to the members of Group I., others to the members of Group II., and, as regards future developments, it is undoubtedly to Group III., that the greatest interest attaches.

Bacilli of Group I., produce, when inoculated into bovine animals, lesions and results indistinguishable from those produced by the inoculation of bovine tubercle bacilli, but the bacilli of Group II., were found to possess far less virulence than the former, and to be incapable of setting up generalised tuberculosis. "When injected subcutaneously, its virulence is unable to overcome the 'powers of resistance' of the tissues of these animals, and these powers either soon arrest the progress of any tuberculosis which may have begun and make the disease retrogress or (in some few instances) prevent the disease being set up at all."

Although there are these material differences between the members of Group I., and of Group II., the Commissioners regard the two groups as differing not in kind but in degree only, and they were led to this conclusion largely by the behaviour of organisms, which they provisionally placed in Group III.

It was found by a series of "passage" experiments that although the tubercle bacillus is a relatively stable organism, its stability is probably not absolute; that under certain conditions the bacillus may tend on the one hand, apparently, to approximate to that of the bovine type, and under certain circumstances to that of the human type; and as to this the Commissioners observe in section 61, after discussion, the possibility of explaining the phenomena observed on a thesis of mixed infection.

"On the other hand, if we assume that the characters of the bacillus of tuberculosis (whether human or bovine) are not always absolutely stable (we have seen that some facts point to this) we may adopt the following alternative view:—

"We may suppose that in the case of the passage experiments the original material contained only slightly virulent human bacilli, but that these were in a special condition of instability, so that when subjected to certain influences they became modified in character, and transformed

into highly virulent dysgonic bovine bacilli, these influences being supplied by the tissues of the bovine animals, through the bodies of which the bacilli were passed. Similarly we may suppose that highly virulent bacilli from a bovine source lodged in the human body may, under certain conditions, manifest instability; may, under the influence of human tissues become modified in character, and so may be transformed into bacilli possessing all the features of the bacilli of Group II."

The Commissioners are now engaged in an endeavour to ascertain, if possible, which of these alternatives (mixed infection or change of type) is the true one, but while leaving the decision of the question to the experiments of the future, the Commissioners point out what are the practical bearings of the inquiry according as to one or other view is proved to be the true one, and the importance of the issue, in so far as it concerns the channel by which tuberculosis shall in future be attacked, cannot be easily over-rated.

"Should it be proved that the cases in question were due to an admixture with the bacilli of human source of a few bacilli of bovine source, the two kinds always remaining distinct, the one from the other and never becoming changed the one into the other, we should have no need to enlarge appreciably our conception of the extent to which the human body is subject to bovine tuberculosis. Such cases of admixture must be few and their effect slight; bovine tuberculosis in the human body would practically be limited to cases such as those which furnish Group I. Should, however, it be conclusively proved that a eugonic bacillus of low virulence may be modified under certain conditions into a dysgonic bacillus of high virulence and *vice versa* our views as to the relation of human to bovine tuberculosis must be very different. Such a conclusion would lead to the following view:—Bacilli from a bovine source entering a human body in scanty numbers may become lodged there without immediately provoking a generalised progressive tuberculosis. During their sojourn there they may become modified into eugonic bacilli of low virulence; and they may then give rise either to a limited tuberculosis only or under the influence of certain conditions to a generalised progressive tuberculosis. For some time after the change they may remain unstable and capable of reverting to their bovine character under changed conditions, when subjected, for instance, to the influences of bovine tissues as in the passage experiments. Or after a long stay in the human body their character become so fixed that they cannot be distinguished from bacilli conveyed directly from man to man.

"It is on account of the far-reaching bearings of the conclusion that we are unwilling to make any statement at all premature."

The definite conclusions to which the Commissioners have already arrived are as follows :—

“There can be no doubt but that in a certain number of cases the tuberculosis occurring in the human subject, especially in children, is the direct result of the introduction into the human body of the bacillus of bovine tuberculosis ; and there can also be no doubt that in the majority at least of these cases the bacillus is introduced through cow's milk. Cow's milk containing bovine tubercle bacilli is clearly a cause of tuberculosis and fatal tuberculosis to man.

“Of the sixty cases of human tuberculosis investigated by us, fourteen of the viruses belonged to Group I., that is to say contained the bovine bacillus. If, instead of taking all these sixty cases, we confine ourselves to cases of tuberculosis in which the bacilli were apparently introduced into the body by way of the alimentary canal, the proportion of Group I. becomes very much larger. Of the total sixty cases investigated by us, twenty-eight possessed clinical histories indicating that in them the bacillus was introduced through the alimentary canal. Of these, thirteen belong to Group I. Of the nine cases in which the cervical glands were studied by us three, and of the nineteen cases in which the lesions of abdominal tuberculosis were studied by us, ten belong to Group I.

“These facts indicate that a very large proportion of tuberculosis contracted by ingestion is due to tubercle bacilli of bovine source.

“A very considerable amount of disease and loss of life, especially among the young, must be attributed to the consumption of cow's milk containing tubercle bacilli. The presence of tubercle bacilli in cow's milk can be detected though with some difficulty if the proper means be adopted, and such milk ought never to be used as food. There is far less difficulty in recognising clinically that a cow is distinctly suffering from tuberculosis in which case she may be yielding tuberculous milk. The milk coming from such a cow ought not to form part of human food, and indeed ought not to be used as food at all.

“Our results clearly point to the necessity of measures more stringent than those at present enforced being taken to prevent the sale or the consumption of such milk.”

It will be noted that the conclusions arrived at by this Commission are very similar to those come to by the Commission which reported in 1895, but that the present Commission proposes to debar all milk coming from tuberculous cattle, whether or not the udders themselves are diseased. It will be seen, too, that this last report revives some very interesting speculations as regards the importance of latency, a question which has already been referred to earlier in this chapter.

It would appear not improbable, in view of the evidence here adduced, that a material amount of human tuberculosis is attributable to the introduction into the intestinal tract of tubercle of bovine origin.

The third chapter of this report will be devoted to a consideration of some of the epidemiological evidence relative to the degree of communicability of human tuberculosis between man and man, and it has to be pointed out that the report as a whole deals almost solely with what may be termed the human sources of the disease.

It is of importance, however, to observe that this question must be influenced very largely by the amount of tuberculosis which the Commission now sitting is able to ascribe as due to bovine tuberculosis or rather, perhaps, it would be more correct to say that the evidence which can be adduced as to personal infection must be considered side by side with the evidence adduced relative to infection from the bovine animal.

But before passing on to deal with the evidence relative to communicability it will be desirable to discuss the behaviour of pulmonary tuberculosis in England and Wales during the last fifty years. There will be advantage in doing this at an early stage in the report because of the wide-spread misconception which obtains as to the prevalence of the disease. The public attention which has been drawn to the subject of pulmonary tuberculosis during recent years has led to the belief that the malady is increasing, whereas, as will now be shown, it has undergone an altogether phenomenal decline which, if continued in years to come, may result in the total extinction of the disease. A proper appreciation of this fact is essential for anything approaching a correct estimate of the value of curative and preventive measures.

CHAPTER II.

THE DECLINE IN THE DEATH-RATE FROM PULMONARY
TUBERCULOSIS IN ENGLAND AND WALES.

It will be seen by reference to the following Chart (No. I.) which shows the mean annual death-rate from pulmonary tuberculosis per 10,000 of the population in England and Wales since 1851, that there has been, with occasional slight rises, a steady *decline* in the death-rate in question over the whole period.

It may, too, be added on the authority of Dr. Tatham,* of the General Register Office, that with a few trifling exceptions there has occurred during the last 50 years a *decrease* in the mortality ascribed to phthisis at every age period and in both sexes; but that the rate of decrease has varied widely, and has been much greater in the female than in the male sex. Dr. Tatham, however, is careful to note that the figures must be taken for what they are worth.

As I have pointed out elsewhere,† all these statistics must be accepted with the greatest circumspection and reserve. This is more particularly the case in any attempts to contrast the behaviour of the statistics of one country with those of another, but even in respect of the different periods of the same country there are obvious difficulties. These difficulties are due mainly to altered nomenclature, better diagnostic methods, greater facilities for obtaining medical assistance in hitherto inaccessible districts, and the application of bacteriology to medicine.

In so far as phthisis is concerned, Dr. William Farr in his 26th annual report drew attention to the fact that there were some indications that between 1850 and 1863 there was a transfer of deaths from phthisis to deaths from bronchitis, *i.e.*, that although the death-rate from phthisis had diminished that from bronchitis had increased. But it also appeared that by far the greater amount of the increases from bronchitis had taken place at ages subsequent to 65, *i.e.*, at the period of life when the natural incidence of phthisis is but slight. And there would seem on the whole, having regard to the variations at the several age groups, that transference of mortality can under any circumstances account for only a part of the marked and continuous decrease that has taken place in the death-rate from pulmonary tuberculosis. It will be seen, too, from the tables given in the accompanying

* Transactions of the British Congress on Tuberculosis, Vol. II.

† Milroy Lectures, 1902.

footnote* which I have constructed from the Registrar-General's annual reports, and which relate to all ages in every case, that there has been a substantial decrease in the death-rate from "other tuberculous diseases" since 1880, and that as regards "diseases of the respiratory system" a considerable fall has been apparent in recent years.

It is, nevertheless, well to remember in examining the charts in this chapter, as Dr. Ransome pointed out to the Epidemiological Society in 1905, that prior to 1874 the certificate of the cause of death was not compulsory; that by way of illustrating the uncertainty which surrounded some of the statistics about that time, he quoted a statement from the Twenty-seventh Annual Report of the Registrar-General, in which Dr. Farr refers to several cases of fraud on the part of the registrars:—"In the course of twenty-seven years out of a body of 2,200 officers four for the sake of a shilling an entry inserted long series of fictitious entries of deaths which never occurred. They inserted the particulars of hundreds of deaths." Dr. Ransome, however, adduces arguments which tend to the conclusion that it is not necessary to entirely reject the mortality figures during the thirty years preceding 1868.†

* TABLE ABSTRACTED FROM REGISTRAR-GENERAL'S ANNUAL REPORTS SHOWING CRUDE DEATH-RATE, PER 1,000,000 LIVING, FROM THE UNDER MENTIONED CAUSES FROM 1858-60 to 1901-1905.

—	1858-60 (3 years).	1861-65 (5 years).	1866-70 (5 years).	1871-75 (5 years).	1876-80 (5 years).
Phthisis	2,565·0	2,526·6	2,447·8	2,218·0	2,039·8
Other Tubercular and Scrofulous Diseases	739·0	784·4	752·4	722·6	777·0
Diseases of the Respi- ratory System ...	3,265·0	3,320·6	3,394·2	3,685·4	3,795·6

—continued.

—	1881-85 (5 years).	1886-90 (5 years).	1891-95 (5 years).	1896-1900 (5 years).	1901-1905 (5 years).
Phthisis	1,880·4	1,635·4	1,462·2	1,322·6	1,215·2
Other Tubercular and Scrofulous Diseases	710·2	687·0	658·4	581·0	524·6‡
Diseases of the Respi- ratory System ... (Excluding Croup.)	3,549·8	3,639·2	3,670·6	3,056·6	1,475·0‡

† Transactions of the Epidemiological Society of London, New Series, Vol. XXIV., Session 1904-1905. "Phthisis Rates: their significance and their teaching," by Arthur Ransome, M.D., F.R.S.

‡ Since 1901 the mortality from Lupus has been included among Tuberculous Diseases, while that from Pneumonia has been excluded from diseases of the Respiratory System. The mean death-rates from these causes during 1901-5 were, Lupus 2 and Pneumonia 1270·8 per million.

In the Seventeenth Annual Report of the Registrar-General (for 1854) Dr. Farr says when speaking of phthisis: "Within the last eight years the disease appears to have declined to some extent, for the deaths by phthisis were 53,317 in 1847 and 51,284 in 1854. Some may be inclined to see in this evidence of the efficiency of the modern methods of treatment; but it will be well to wait before coming to a definite conclusion for more observations. And the increase of deaths by bronchitis from 16,499 to 20,062 in the same period, with the gradual diffusion of diagnostic skill, must also be taken into account."

But whatever may be the trustworthiness or otherwise of the statistics of any given country, it will, I think, be generally conceded by statisticians of all countries that the mortality

The late Dr. William Ogle, writing in the Supplement to the Forty-fifth Annual Report of the Registrar-General on the mortality from phthisis during the ten years 1871-80, observes: "The mortality from *phthisis* showed a very remarkable diminution, there being an annual gain of 359 lives to a million living. This gain, however, was more than counterbalanced by a loss of 396 lives from *diseases of the respiratory system*. Knowing how vague has been the use of the term "phthisis" it is tempting to assume that the apparent changes were simply due to transference from one heading to another and that this mortality itself underwent little change. And probably to some extent this is true, for the term phthisis, or consumption, is not now used in quite so vague a manner as it was in former years when any undiagnosed chronic affection of the lungs was likely to be so designated. Still this can hardly be supposed to be the explanation of the whole matter, for while this registered mortality from phthisis fell at every one of the successive age periods the registered mortality from diseases of the respiratory organs remained practically unaltered in the periods of life between the 5th and 26th year of age and only rose among young children under 5 and among persons over 25 years of age.

How much of the fall of the registered mortality from phthisis was real and how much was merely due to transference it is impossible to say, but it must be noted that the mortality ascribed to other forms of tuberculosis, with the exception of hydrocephalus, showed no decline. Under "other forms of tuberculosis" are comprised a certain number of deaths simply ascribed to tubercular diseases without further specification, but the great bulk consists of deaths from *tabes mesenterica* and *tubercular peritonitis*."

Dr. Tatham, in the Supplement to the Fifty-fifth Annual Report of the Registrar-General which relates to the mortality in England and Wales during the period of ten years 1881-90, states:—"The aggregate mortality from tubercular diseases as a group has decreased continuously throughout the last three decennia, the rates having fallen from 3,240 per million in 1861-70 to 2,420 in 1881-90; but in spite of the decline, the aggregate death-toll from diseases of the tuberculous group is still so heavy as to demand constant and watchful attention. On reference to Table 5 it will be seen that pulmonary consumption, the principal disease in this group, is mainly fatal during adolescence and maturity, whilst *tabes mesenterica*, acute hydrocephalus, and the remaining forms of tuberculosis are fatal chiefly to young children. In fact the mortality from tuberculous diseases as a group is found to be very serious throughout the entire span of life, from infancy to old age. Tubercular phthisis, the most destructive member of this group, caused a mortality in the recent decennium equal to 1,724 per million: these figures indicate a life saving on the rates of 1871-80 equal to 392 per million living, the life saving in 1871-80 as compared with the previous decennium having been 359 per million. In the course of the last year the crude mortality from phthisis has decreased by 30 per cent."

returns of England and Wales are the least unreliable of any of those which the world possesses.

Moreover, pulmonary tuberculosis is here dealt with alone, not other forms of tuberculosis; and as to this Dr. Tatham observes in the Sixty-fourth Annual Report of the Registrar-General: "In the diagnosis of pulmonary phthisis there is little danger of serious error, but the identification of certain other forms of tuberculosis is attended with far greater difficulty."

It must, too, be recognised that, whether reliable or not reliable, statistical records are the only tests which we possess for ascertaining the behaviour of any given disease at any given time, and that as Dr. Straus observes on page lx of his "*La Tuberculose et son Bacille*": *La Statistique malgré ses imperfections, demeure encore le meilleur élément d'enquête.*

It is permissible, therefore, by the aid of the accompanying charts to draw some general inferences as to the effect, if any, upon the death-rate from pulmonary tuberculosis of certain measures or discoveries which might be held upon general principles to be likely to influence the phthisis curve in the direction of an increasing rate of decline, and to judge of the rate of decrease prior and subsequent to the introduction of any given measures.

It would be unreasonable to expect that the special measures with regard to the control of pulmonary tuberculosis which are being taken in many parts of the country at the present time should forthwith manifest definite effect upon the pulmonary tuberculosis mortality curve for England and Wales as a whole. It is, however, possible that there may be some manifestations of such influences before 1910; and with a view of enabling those interested in the problem to complete the curve up to that year as the returns of the Registrar-General become available, spaces have been left for the entry of subsequent rates.

The main point which may be insisted upon at this juncture is that, so far as can be gathered from the mortality returns, pulmonary tuberculosis (consumption) is tending to decrease in England and Wales, and that this decrease had been apparently taking place at a high rate prior to the belief in the communicability of the disease, to the introduction of the Public Health Act, 1875, and to the discovery of the tubercle bacillus by Koch in 1882. This fact is of great importance in relation to a proper comprehension of the tuberculosis problem. It will be seen by the charts that for the last three years the death-rate from pulmonary tuberculosis has been about 12 per 10,000, *i.e.*, rather more than one person out of every 1,000 living dies annually from this disease. I say "about 12 per 10,000," because in the construction of the charts the nearest whole number has been taken in each instance.

The chart hereunto annexed commences at the year 1851. It may be observed that the records, however slight may be their

value, are available (with the exception of the years 1843-1846) for as far back as 1838. As these figures may be useful for reference purposes, I have compiled a table* showing, in addition to the death-rate, the total deaths for each year. From this table it will be noted that although the population has enormously

TABLE showing ANNUAL NUMBER of DEATHS and ANNUAL and QUINQUENNIAL DEATH-RATES from PHTHISIS per 10,000 LIVING from 1838 to 1905.

Year.	Total deaths.	Death-rate per 10,000 living.	Average annual death-rate per 10,000 living for each quinquennial period.	Year.	Total deaths.	Death-rate per 10,000 living.	Average annual death-rate per 10,000 living for each quinquennial period.
1838	59,025	39.9	—	1873	51,355	21.9	22.1
1839	59,559	39.3	—	1874	49,379	20.8	—
1840	59,923	38.9	38.8	1875	52,943	22.0	—
1841	59,592	38.2	—	1876	51,775	21.1	—
1842	59,291	37.4	—	1877	51,353	20.7	—
1843	—	—	—	1878	52,856	21.1	20.4
1844	—	—	—	1879	51,272	20.2	—
1845	—	—	—	1880	48,201	18.6	—
1846	—	—	—	1881	47,541	18.2	—
1847	53,317	—	—	1882	48,715	18.5	—
1848	51,663	—	—	1883	50,053	18.8	18.3
1849	50,299	—	—	1884	49,325	18.2	—
1850	46,614	26.2	—	1885	48,175	17.7	—
1851	49,166	27.3	—	1886	47,872	17.3	—
1852	50,594	27.7	—	1887	44,935	16.1	—
1853	54,918	29.8	28.0	1888	44,248	15.6	16.3
1854	51,284	27.5	—	1889	44,738	15.7	—
1855	52,290	27.7	—	1890	48,366	16.8	—
1856	48,950	25.6	—	1891	46,515	15.9	—
1857	50,106	26.0	—	1892	43,323	14.6	—
1858	50,442	25.9	26.0	1893	43,632	14.6	14.5
1859	50,149	25.4	—	1894	41,641	13.8	—
1860	51,024	25.5	—	1895	42,490	13.9	—
1861	51,931	25.8	—	1896	40,251	13.0	—
1862	50,962	25.0	—	1897	41,642	13.4	—
1863	51,072	24.7	25.2	1898	41,335	13.1	13.2
1864	53,046	25.6	—	1899	42,408	13.3	—
1865	53,734	25.4	—	1900	42,987	13.3	—
1866	55,714	26.0	—	1901	41,227	12.6	—
1867	55,042	25.3	—	1902	40,671	12.3	—
1868	51,423	23.3	24.4	1903	40,132	12.0	12.1
1869	52,270	23.5	—	1904	41,851	12.3	—
1870	54,231	24.1	—	1905	38,950	11.4	—
1871	53,376	23.4	—	1906	39,746	11.5	—
1872	52,589	22.7	—				

* These figures have since 1851 been taken from the Registrar-General's Annual Reports, but prior to that date from an article by the late Mr. T. W. Thompson on "The Natural History of Infectious Diseases" in Murphy and Stevenson's "Treatise on Hygiene."

CHART NO. 1.

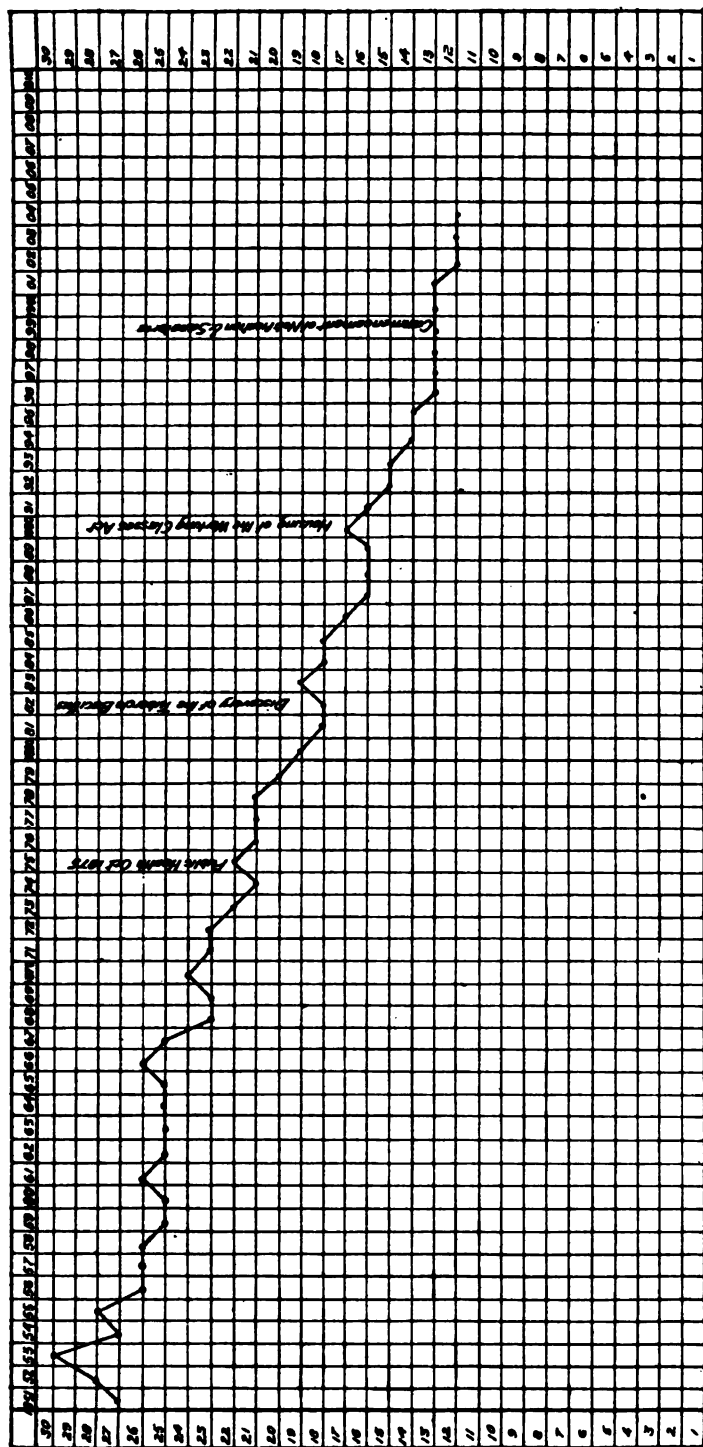
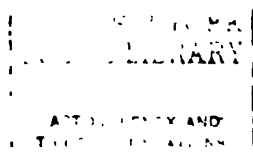


Chart showing death-rate from Pulmonary Tuberculosis per 10,000 of the population in England and Wales from 1851-1904, together with the dates of the introduction of certain measures which may be regarded as having been likely to exert a beneficial influence upon the downward tendency of the disease. It will be noted that no direct measures were taken against the malady until 1899.

N.B.—The death-rate in 1905 was 11.4 and in 1906 was 11.5.

(Th face page 86.)



increased since 1838 the actual number of deaths has undergone a steady and marked reduction, while the death-rate has fallen from 38·8 per 10,000 in the quinquennial period 1838-42 to 12·1 per 10,000 in the quinquennium 1901-1905.

Doubtless the figures in the earlier years of registration were not very reliable, but it may be said generally that such figures increase in value as the present day is approached. As Mr. T. W. Thompson observes in the article referred to: "It is gratifying to observe from this table that during the period in question there has occurred both a relative and absolute diminution in the deaths so recorded. In part this is no doubt a matter of nomenclature, but there are independent grounds for thinking that an actual diminution in phthisis mortality has occurred."

The following table shows at a glance the fall in the death-rate which has taken place in the several quinquennia which have elapsed since 1866-70 :—

Quinquennis.			Death-rate per 10,000.
1866-70	...	...	24·4
1871-75	...	...	22·1
1876-80	...	...	20·4
1881-85	...	...	18·3
1886-90	...	...	16·3
1891-95	...	...	14·5
1896-1900	...	...	13·2
1901-1905	...	...	12·1

Commenting upon these facts in the Supplement to the Fifty-fifth Annual Report of the Registrar-General relating to the mortality in England and Wales during 1881-90, Dr. Tatham remarks: "As had been the case in the preceding decennium so was it also in the ten years under present review, the mortality from phthisis showed a decline at each of the eleven age groups in both sexes, with the single exception that in 1881-1890 the rate among males over 75 years was higher by 14 per cent. than in the preceding ten years."

As regards "other tuberculous diseases," Dr. Tatham observes: "The aggregate death-rate from these forms of the disease has shown a slight decline in the course of the last three decennia."

"As in the case of phthisis, the mortality from other tuberculous diseases is considerably higher among males than among females."

In so far, therefore, as England and Wales are concerned it would appear that the decline in the phthisis death-rate which has now been manifesting itself for over half a century may, if continued, result ere long in the total extinction of the

malady; that the malady may, indeed, follow the course taken by such diseases as leprosy, relapsing fever, typhus fever, malaria, &c., all of which diseases have at least for the time being practically disappeared from this country.

In 1897 Dr. Arthur Ransome,* in his Weber-Parkes Prize Essay, observed in connection with a chart which he had constructed from the returns of the Registrar-General: "A straight line drawn from the highest to the lowest point of the curve of the disease shows that its decline has been remarkably steady and regular; moreover, a mathematician would judge that the rate of its diminution has been a slightly increasing one. We may further remark that if phthisis diminish at the same rate during another thirty years it will have entirely disappeared by the end of that period."

The foregoing observations relate to England and Wales as a whole, and in order to show in what measure this general tendency towards decrease of phthisis has been participated in by the several counties of England and of North and South Wales, I have constructed another chart. Unfortunately, it is only during quite the last few years that the Registrar-General's Annual Reports have contained the rates for the separate counties of Wales; the decennial averages for those counties are therefore, not available.

The chart in question (No. 2) shows by black, by double cross-hatching, and by single cross-hatching the death-rates for each county from pulmonary tuberculosis in each of the decades 1871-80, 1881-90, and 1891-1900. For the figures relative to the last-named period I am indebted to Dr. Tatham, the Superintendent of Statistics at Somerset House, who kindly furnished them, in anticipation of the since published Decennial Supplement, Vol. I., 1891-1900. It will be seen by this chart that the decrease shown for England and Wales as a whole has been participated in by each of the counties at each decennial period.

In the case of some counties the fall has been great, in others small; each square representing a saving of one life per 10,000 of the population. In some instances there has been a saving of 10 lives per 10,000 during the total period covered; in others, where the initial rate was low, the saving has been considerably less.

In 1871-80 the highest rates were recorded for London, Lancashire, and South Wales; in the two former the mean annual death-rate for the decade being 25 per 10,000 of the population, and in the latter 26 per 10,000.

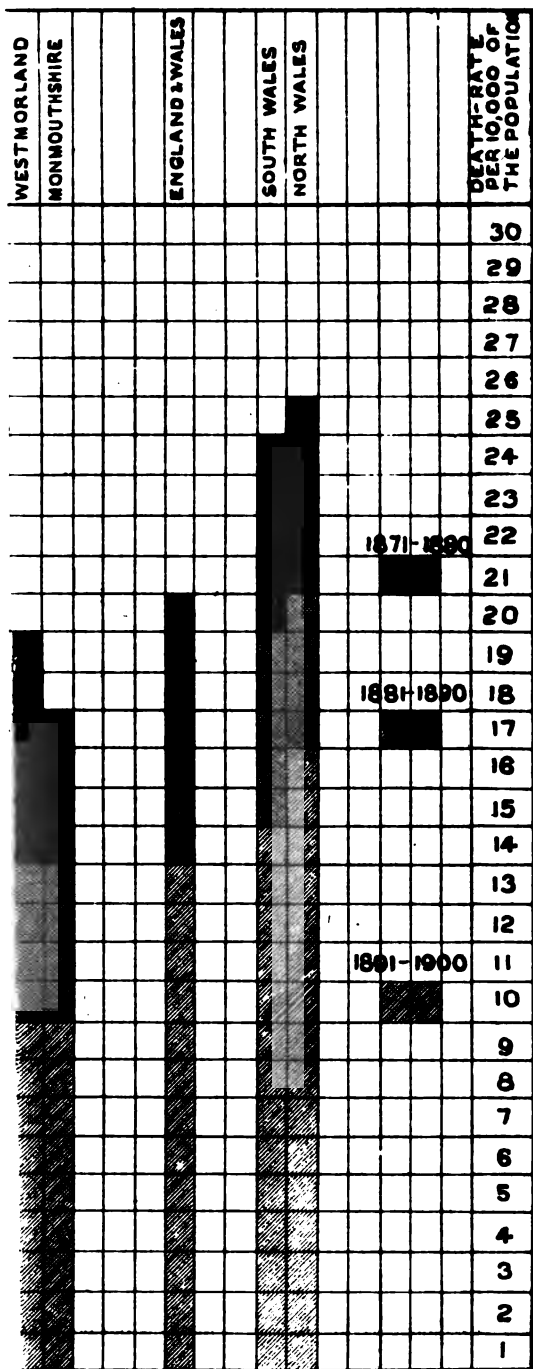
In 1881-90 the highest rates were for London, Northumberland, and North Wales; while for the last decade dealt with

* "Researches on Tuberculosis." The Weber-Parkes Prize Essay, 1897, by Arthur Ransome, M.D., M.A. (Cantab), F.R.S., London: Smith, Elder & Co., 15, Waterloo Place, 1898.



Lives of En.

whole



It will be seen by the accompanying Chart that in practically every County in England there has been a substantial fall in the death-rate from Pulmonary Tuberculosis during the decades 1871-1880, 1881-1890, and 1891-1900 and it may be observed that during all three decades no special measures were being taken towards the reduction of the disease.

tries of England and in North and South Wales

whole numbers in which case the lowest whole

1919

London, Durham, and North Wales yielded the highest figures.

The lowest rates so far recorded (nine per 10,000) is that for the county of Rutland during 1891-1900. But it will be seen that Buckinghamshire, Wiltshire, Staffordshire, Westmorland, and Monmouthshire yielded in the same decennium rates of only 10 per 10,000 of the population, *i.e.*, one death per 1,000 per annum.

As regards the counties of Wales, I am only able to furnish statistics for 1903, 1904, and 1905, but I do this as certain of the counties manifest remarkably high rates.

Death-rate from Pulmonary Tuberculosis per 10,000 Living.

Counties.	1903.	1904.	1905.
Glamorganshire	10·6	12·2	11·1
Carmarthenshire... ..	14·8	16·4	13·9
Pembrokeshire	15·3	13·2	14·5
Cardiganshire	21·2	22·9	21·1
Brecknockshire	10·3	11·8	11·0
Radnorshire	9·5	6·0	6·9
Montgomeryshire	12·6	11·0	13·5
Flintshire... ..	10·3	10·0	9·0
Denbighshire	12·7	12·3	11·2
Merionethshire	18·6	15·3	18·1
Carnarvonshire	17·0	17·2	16·1
Anglesey	13·7	11·0	15·6
England and Wales	12·0	12·3	11·4

In the Registrar-General's Report for 1904 Dr. Tatham points out that without correction the rates for males in four of the twelve Welsh counties exceeded the rate in England and Wales, while as regards females there was similar excess in no less than nine cases.* Corrections for age does not, Dr. Tatham adds, mend matters, but it shows that in five cases the male and

* As regards the registration of deaths in Wales in times past, Dr. Farr stated—

“At one time in South Wales the registration books were in a state of hopeless confusion. At Llanbedr out of 500 notices of death, 101 were certified, 399 were not; and at St. David's out of the same number only 15 were certified.”

With reference to the subject of nomenclature generally Dr. Tatham in the Supplement to the Fifty-Sixth Annual Report of the Registrar-General observes—

“In the early days of civil registration the terms ‘consumption’ and ‘decline’ frequently appeared in death certificates apparently as alternatives for tuberculous phthisis, but these indefinite terms have now fallen into disuse. There is reason to believe that, in the present day, the greater portion of the deaths referred to phthisis are entirely tuberculous in nature; nevertheless we know that this has not always been the case.”

in ten cases the female rates are in excess of the rates for England and Wales. The corrected rate for Cardiganshire is 23·9 per 10,000, that for Radnor being on the other hand only 6·6 per 10,000 ; a lower rate ; it will be noted, than that for any of the English counties during any of the decennia to which Chart No. 2 relates.

It would be interesting to know why in one rural district the rate should be 23·9 while in another and adjoining rural district it should be only 6·6 ; why as regards males Cardiganshire should for 1904 have yielded a rate of 28·0 per 10,000 and Radnorshire in the same period a rate of only 2 per 10,000 ; and why as regards females Cardiganshire should have yielded a rate for males of 20 per 10,000 and Flintshire one of 8·7 per 10,000.

The drain which phthisis and other tuberculous diseases makes upon the population as a whole is, as is well known, enormous, but I may perhaps here refer to an investigation made by the late Dr. T. E. Hayward, the Medical Officer of Health of Haydock, Lancashire, the results of which he presented to the British Tuberculosis Congress in 1901.

Dr. Hayward in place of appending the usual rates asked himself : “Supposing that this disease could be made extinct *how many more would be alive at certain ages, and how much longer would they live?*” This question he proceeded to answer by an examination of the Life Table for England and Wales for 1881-90,* with the view of ascertaining in what manner such table would have been affected on the assumption that during the period to which it relates there had been no deaths either from phthisis or from other tuberculous diseases, all the other causes of mortality meanwhile retaining their proportional intensity.

From the tables which Dr. Hayward was able to construct by his simple modification of Dr. Farr's original method of life table construction he found—

- (a) That if there had been no phthisis the average length of life for each individual born would have been increased by two-and-a-half years.
- (b) That persons who survived to the age of fifteen would have their average expectation of life increased by about three years and a quarter.

These hypothetical gains are, Dr. Hayward observed, greater than those which would be obtained by abolishing the whole group of ailments which used to be classed together as “the seven principal zymotic diseases.”

He added : “As regards the three diseases to combat which the expensive machinery of isolation hospitals chiefly exists—

* “The Mortality from Phthisis and from other Tubercular Diseases considered in some aspects which may be demonstrated by means of Life Tables,” by T. E. Hayward, M.B., (Lond.), F.R.C.S., Eng. Vol. II., Transactions of British Congress on Tuberculosis, 1902.

viz., typhoid fever, scarlet fever, and diphtheria—if they could be entirely exterminated the average increase in length of life of those at birth would only be increased by about a year, and those at age 15 would only have about the fourth part of a year to add to their life expectation.”

Another interesting and striking indication arising from Dr. Hayward's table is that if tuberculosis could be abolished—

- (a) The working period of life (15 to 65) would be lengthened on an average by very nearly two years.

And as showing the importance of eliminating pulmonary as contrasted with other tuberculous diseases the figures indicated that—

- (b) If phthisis had not existed as a cause of mortality in England and Wales, every person living in the year 1891 would have had an average increase in life capital of two years, and that the abolition of all other tuberculous diseases would only have increased the average life capital by the fifth part of a year.

The Age Incidence of Pulmonary Tuberculosis.

As is well known to epidemiologists, each disease has, as it were, a proclivity for a certain age period. For instance, measles, small-pox (in unvaccinated communities where small-pox is endemic), whooping cough, and varicella are, for the most part, diseases of infancy; enteric fever is a disease largely of adolescence; while cancer, bronchitis, diseases of the blood vessels, and degenerative maladies generally are largely confined to later adult life and old age.

Now one of the great characteristics of pulmonary tuberculosis is its tendency to attack and to kill those at the working, marriageable, and reproductive periods of life: that is to say, at ages when loss of working capacity inflicts the greatest economic losses upon the community.

When a child is attacked by an acute disease such as measles, or an adolescent by enteric fever, the resulting economic loss as regards work is little or nothing and in any case is temporary, while loss of the child by such disease is a loss of potential wealth alone. When, however, a married man with children is attacked with a chronic disease such as pulmonary tuberculosis, diminished working capacity, or absolute inability to work, at once ensues; and his wife and family are consequently liable so far to suffer from insufficient nourishment as to become then, or subsequently, a partial charge upon the rates or upon charity.

It is desirable therefore that the student of the tuberculosis problem should have a clear conception of the age periods at which the human subject is most liable to suffer from the malady.

Dr. Tatham* in 1901 stated that "Practically the incidence of phthisis is upon the ages from 15-75 years, very old people and young children being comparatively exempt;" and reference to the accompanying table abstracted from the Sixty-eighth Annual Report of the Registrar-General(1905) will serve to show what was the actual age distribution of the disease during the quinquennium 1900-1904. In the same report Dr. Tatham points out that in England and Wales as a whole and in the urban group of counties, the age of highest mortality from tuberculosis is at ages from 45 to 55 for males and at 35 to 45 for females. In the rural group it is from 25 to 35 for both sexes.†

It is, however, necessary to point out that this precise age distribution of phthisis has not always obtained, and that during the last forty years, as will be seen below† in an extract taken from a communication which Dr. Tatham made to the British Congress on Tuberculosis in 1901, very material shiftings of the maximum incidence of the disease have taken place.

Phthisis Mortality at Age Group.		Average 1900-1904.			Year 1905.		
		England and Wales.	Urban Counties.	Rural Counties.	England and Wales.	Urban Counties.	Rural Counties.
Both Sexes.	0- ...	341	404	238	348	395	271
	5- ...	176	194	144	162	180	127
	10- ...	299	296	335	261	266	237
	15- ...	902	875	1,045	850	784	972
	20- ...	1,448	1,358	1,815	1,300	1,193	1,682
	25- ...	1,855	1,848	2,019	1,695	1,651	1,919
	35- ...	2,293	2,582	1,777	2,007	2,184	1,716
	45- ...	2,274	2,701	1,577	2,064	2,412	1,503
	55- ...	1,802	2,111	1,385	1,689	2,001	1,448
	65- ...	949	1,130	785	785	1,170	759
Males.	0- ...	366	443	248	355	416	296
	5- ...	149	165	131	141	156	93
	10- ...	182	193	185	151	167	112
	15- ...	799	795	838	722	685	851
	20- ...	1,643	1,532	2,016	1,458	1,350	1,811
	25- ...	2,147	2,131	2,320	1,992	1,962	2,124
	35- ...	2,811	3,218	2,061	2,449	2,697	2,091
	45- ...	3,130	3,808	2,001	2,851	3,481	1,947
	55- ...	2,562	3,116	1,758	2,420	2,941	1,929
	65- ...	1,309	1,661	968	1,300	1,683	932

* "Memorandum on Mortality from Tubercular Phthisis in England and Wales during the last forty years," by John Tatham, M.D., F.R.C.P. Transactions of British Congress on Tuberculosis, Vol. II., 1902.

† Tracing backwards the incidence of maximum mortality from phthisis, we find that it has not always been at ages from 45 to 55 for males and from 35 to 45 for females, as it is at present. In the decade 1851-60 phthisis mortality was at its highest among males at ages from 20 to 25 and among females at ages from 25 to 35. Thus the age of maximum phthisis mortality has been postponed in both sexes. In other words, either the saving of life has been greater at the ages which were formerly most liable to phthisis than at the ages immediately following, or persons specially liable to phthisis have lived longer than they would have done under the earlier conditions.

Phthisis Mortality at Age, Group.		Average 1900-1904.			Year 1905.		
		England and Wales.	Urban Counties.	Rural Counties.	England and Wales.	Urban Counties.	Rural Counties.
Females.	0- ...	316	364	228	312	375	245
	5- ...	203	222	156	183	205	161
	10- ...	417	397	507	371	363	365
	15- ...	1,002	951	1,258	937	879	1,097
	20- ...	1,274	1,203	1,517	1,158	1,053	1,568
	25- ...	1,593	1,590	1,197	1,430	1,267	1,740
	35- ...	1,807	1,978	1,517	1,593	1,698	1,374
	45- ...	1,481	1,657	1,197	1,335	1,453	1,106
	55- ...	1,136	1,231	1,058	1,049	1,179	1,029
	65- ...	670	736	639	708	790	621

The Sex Incidence of Pulmonary Tuberculosis.

At the present time (as has been the case for very many years previously) the incidence of pulmonary tuberculosis is materially heavier upon males than upon females, and this fact raises some interesting speculations as regards the etiology of the disease.

In the following Chart (No. 3)* there has been recorded separately the incidence of phthisis on the male and on the female sex. From the resulting curves representing the behaviour of the disease the remarkable fact is brought out that from 1851 to 1863 the greatest incidence of the disease was upon females;† that from 1864 to 1868 inclusive the rates were practically parallel; and that after the latter date the incidence on females became substantially less than that upon males. It will be noted that at the present time males suffer to the extent of some 4 deaths per 10,000 more than females.

* The corrected rates for 1905 were 13·4 for males and 9·4 for females.

† As illustrative of this high incidence of *consumption* upon the female sex in the earlier years of registration Dr. William Farr, in the Second Report of the Registrar-General (that for 1839), after observing that "Consumption is 8 per cent. more fatal to females than to males," adds "The higher mortality of English women by consumption may be ascribed partly to the in-door life which they lead and partly to the compression preventing the expansion of the chest by costume. In both ways they are deprived of free draughts of vital air, and the altered blood deposits tuberculous matter with a fatal unnatural facility. *Thirty-one thousand and ninety* English women died in one year of this incurable malady! Will not this impressive fact induce persons of rank and influence to set their countrywomen right in the article of dress, and lead them to abandon a practice which disfigures the body, strangles the chest, produces nervous or other disorders, and has an unquestionable tendency to implant an incurable hectic malady in the frame? Girls have no more need of artificial bones and bandages than boys." And in the Third Annual Report Dr. Farr states: "At the adult age when consumption chiefly prevails the number of men and women living are nearly equal, yet 31,466 females and 28,106 males died of this disease."

Further analysis of the figures as regards sex incidence brings out the interesting but puzzling fact that the liability of females to die of pulmonary tuberculosis at ages under five is less than that of males, while between the ages of 5-25 females are more liable thus to die than males, after this age the liability is decidedly greater among males. The explanation of the deviation in the male and female curves, as shown in the annexed chart, is that the rate amongst the adult females has fallen more rapidly than that among adult males.

A study of the rates at each of the age groups, during the last four decennial periods shows that at the age period 15-20 the female rate exceeded the male for each decennial period; at ages 20-25 the female rate was in excess only during 1861-70 and 1871-80, while, as regards the age period 25-30, it was only during 1861-71 that the female rate was in excess; in other words the female excess has been confined to earlier age groups during each successive decennial period.

Various explanations have from time to time been offered of the peculiar variation of the incidence of pulmonary tuberculosis upon the sexes, but there are material difficulties in the way of the unqualified acceptance of any theory yet advanced. Perhaps the greatest stumbling block is presented by the change of maximum incidence from females to males, which occurred in the earlier periods of registration, a subject which will shortly be referred to again.

It has been suggested that the higher incidence upon the male during adult and later life is due to occupational conditions and, as will be seen later, there are certain occupations which do, *per se*, apparently render the worker therein peculiarly prone to develop pulmonary tuberculosis. There can, moreover, be no question as to the unwholesome condition under which certain industries have been, and still are, carried on. It is not, however, altogether clear that the difference in incidence, which may be referred to male occupational conditions is sufficient to account for the whole of the observed remarkable disparity of incidence on sex. By some of those who have speculated upon this subject, incidence of the disease upon persons engaged in certain occupations has been regarded as having been due to increased opportunities of infection, and in some measure this is, in all probability the case. But it is probable that part of this occupational incidence may be due rather to the actual wounding of lung substance than to increased opportunities for infection, a view which receives strong support from the study of the behaviour of phthisis amongst Cornish miners, as also in some degree amongst the Sheffield grinders. If this subject be approached from the standpoint of infection alone, it is difficult to account for the relative immunity of females, seeing that they often act as the nurses of tuberculous husbands or children, and that in this fashion they are likely to be exposed for protracted periods to concentrated infection in the ill-ventilated and often over-

CHART No. 3.

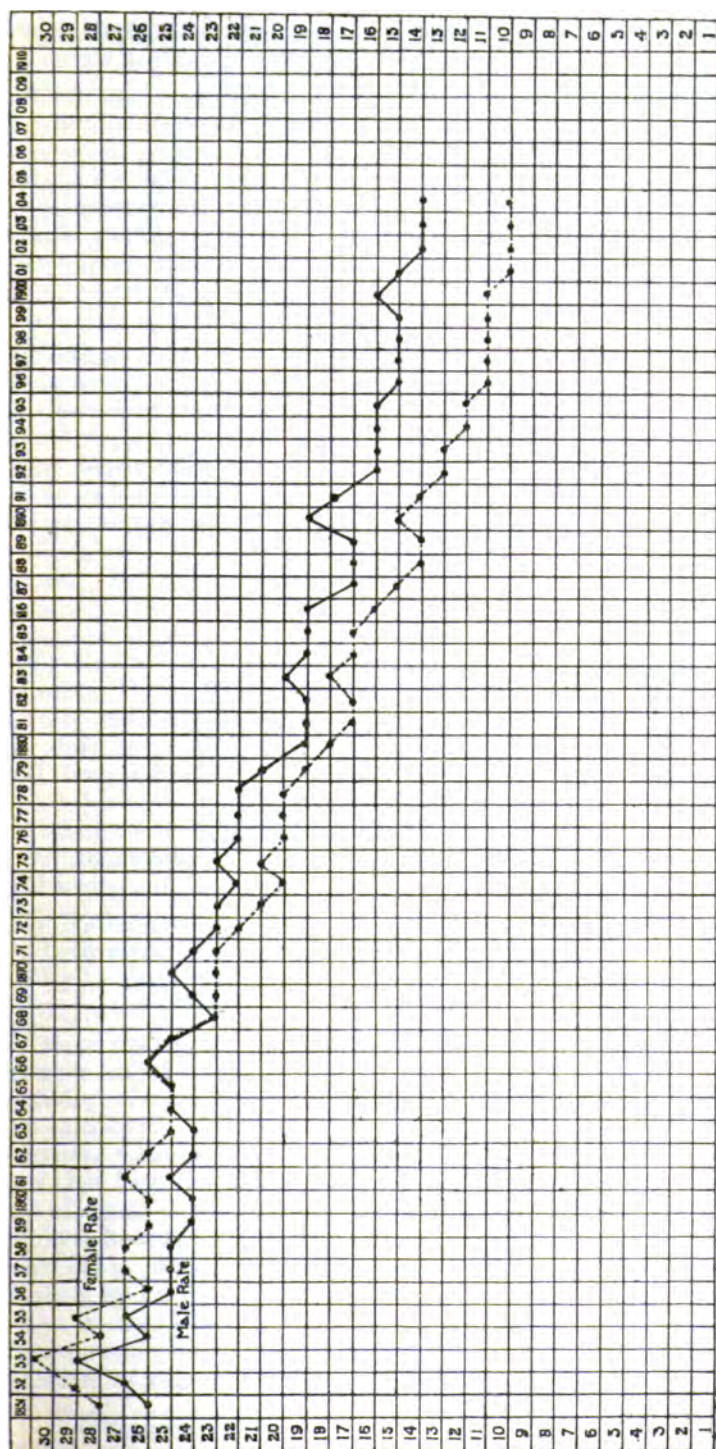
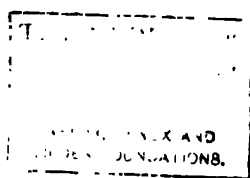


Chart showing male and female death-rate per 10,000 from Pulmonary Tuberculosis in England and Wales per 10,000 of the population from 1851-1904. It will be noted that the death-rate amongst females was higher than that amongst males until 1864, which after running practically parallel with the male rate for some years became gradually lower than the male rate.

(To face page 44.)



crowded homes of the poor, and under circumstances which promote ill-health and predispose to the disease.

Others have expressed the view that it is the improvements in the homes of the poor which is largely responsible for the lessened incidence of pulmonary tuberculosis upon females, they being more likely to be influenced by such conditions than the males, who commonly are absent from the home during a large portion of each working day. It has, too, been suggested that the greater resort of males to public houses and to common lodging-houses, where they are more likely than at home to come in contact with infection is a factor in the problem.

Sir Hugh Beever* has suggested that the explanation may in part be a physiological one. He advances the proposition that it is the power of the growing lung to resist infection, which determines different incidence of the disease on sex at early ages. At a time when most persons are highly prone to nearly all the specific infectious diseases, and when the lungs are, he thinks, exposed to tuberculous infection as much as at any other age the death-rate from pulmonary tuberculosis is relatively insignificant. He suggests that this power of the growing lung to resist infection may account for the very regular difference in the sex incidence of phthisis up to 20 years of age, there having been a regular excess in girls and young women from 1860 onwards. He points out too that girls and boys are not, physiologically speaking, properly comparable at the same ages, and girls develop much more rapidly and suddenly than boys, the rapid lung development of girls being particularly noticeable. It is, in his view, the full grown lung of the girl of 15 years of age, which having lost its resistance to the tubercle bacillus leads to the death-rate of the 15 year old girl from phthisis being equal to that of the boy of 17.

Dr. Tatham expresses somewhat the same idea, when he says, "In both sexes it is with the approach to maturity that the real liability to death by phthisis begins, and this is true of recent as well as earlier years."

It is, of course, conceivable that some of the differences of sex incidence may be, for the want of a better word, a matter of sex proclivity, a suggestion which might possibly receive support from analogy. Moreover, the general experience at many sanatoria, wherein the statistics are properly kept, is to the effect that both the immediate and after-results are better in the cases of females than of males, a fact which has been brought into considerable prominence by the German statistics (Part IV., Chap. III). But this argument would appear to be weakened, although by no means entirely destroyed, by the circumstances of the remarkable change of sex incidence, which occurred in England and Wales in the sixties of the last century, and difficulties as regards its acceptance arise from the fact that in

* The Declension of Phthisis, "Lancet," April 15th, 1899.

Ireland the female rate exceeds the male, and that in Scotland a similar excess obtained until recently. So also the fact, as has been already indicated, that at the earlier age periods the female tuberculosis death-rate exceeds the male, adds another complication to the sex incidence problem.

Curiously enough, too, a somewhat similar change of sex incidence has taken place within the last few decades in at least certain portions of the United States. According to Mr. Hoffman,* who has made a detailed study of American statistics from an actuarial point of view, the mortality from tuberculosis in the two sexes was in 1871 about equal, and this condition of affairs continued up to 1885-1886, after which time a marked alteration in the rate of fall occurred, the female death-rate diminishing at a much more rapid rate than the male, so much so, indeed, that in 1901 the female death-rate was 18 per 10,000, and the male death-rate 27 per 10,000. Mr. Hoffman points out that the fall in the male death-rate had been but slight at those ages which are of most importance to industry, the decline being practically confined to ages over 60, *i.e.*, there has been but little decline at those periods of life during which a large number of the working classes are employed in unhealthy trades.

Mr. Hoffman is inclined to attribute the fall in the death-rate amongst females largely to the improved conditions of working classes in United States during the past fifteen years, an improvement which, in his opinion "has unquestionably been of far more benefit as to the health and longevity to the female element of the population than to the male."

Although, therefore, there has been in some parts of America a steady decline in the death-rate from tuberculosis during many years the death-rate amongst "the male population at ages 20 to 60 has remained almost wholly unaffected, while for the females the decline in the death-rate has been considerable at all age periods."

We have, therefore, the extremely interesting fact that in England and Wales and in Scotland, as also in certain parts of the United States of America, the tuberculosis death-rate amongst females has fallen at a more rapid rate than amongst males.

In England and Wales female death-rate fell below the male about the year 1868; in certain parts of America about twenty years later, and in Scotland not until some five or six years later still.

It thus appears that in all these countries there has at one or another time, within the last thirty years, been at work some

* Industrial Insurance and the Prevention of Tuberculosis by Frederick L. Hoffman, Statistician of the Prudential Insurance Company of America. Transactions of the British Congress on Tuberculosis, Vol. II., William Clowes and Son, London, 1902.

force or forces, industrial or other—certainly not a directly preventive force in the sanitary sense—which, while in some degree inhibiting the fall in the male rate has not exerted any corresponding restrictive effect upon the fall in the female death-rate.

It would seem not improbable that factory and workshop conditions have been responsible for the inhibition in the fall of the male death-rate, and that improved home conditions are continuing to promote the decline in the female death-rate. If this be the case to a material degree it might perhaps be anticipated that the widespread prevalence of female factory labour in certain parts of England would have led to some inhibition of the female death-rate, but whether this is so or not is uncertain. There appears, however, to be some evidence pointing to the conclusion that even when under precisely the same individual conditions the incidence of phthisis on females is less than on males.

It has been suggested that better wages whenever they are received might, generally speaking, have the effect of improving the resistance of the female to a greater obvious extent than that of the male. When wages are low and the family is in financial straits the last to suffer from deficiency of food is, it is suggested, the male worker. Hence the resistance of the female under poverty conditions would be likely to be less than that of the male. With, however, the advance of prosperity the female would share equally with the male, and with a corresponding increased resistance her death-rate from tuberculosis would fall.

A further discussion of this interesting problem would entail the introduction of historical, social and economical considerations, for which there is no adequate space in this volume. It is clear, however, that a closer study of this change of sex incidence in several countries than has yet been undertaken would be likely to add very materially to our knowledge of important factors in tuberculosis.

As regards this question of sex incidence Mr. Adair Hore, of the Local Government Board, has drawn my attention to the fact that the fall in total pauperism among adult females in England and Wales has been much more marked than amongst adult males, a point which is well brought out by the following figures as regards England and Wales :—

Rate per 1,000 of the Population.

—	1872.	1882.	1892.	1902.
	Per cent.	Per cent.	Per cent.	Per cent.
Male paupers 16 and over ...	28	20	18	18
Female paupers 16 and over	54	36	30	28

Mr. Hore points out that the female pauperism rate is throughout in excess of the male rate, and this decline in the female rate suggests he thinks, the operation of some new factor which has increased the means of living for females to a greater extent relatively than is the case with males. Such factor is, in his view, the rapid increase of female employment as instanced by the following figures :—

Number of women occupied per 1,000 of total of both sexes engaged in—

—	1871.	1901.
Tailoring	254	471
Hat and cap making...	378	466
Drapery trade	257	504
Hosiery manufacture	468	713
Stationery	380	643
Carpet manufacture	312	517
Commercial clerical work	16	153

This increase in female employment is evidently well worth further study in its relation to the sex incidence of pulmonary tuberculosis.

Whatever may be the relative importance of the several causes which have led to the remarkable decline in the death-rate from pulmonary tuberculosis which has been discussed in this chapter, it is clear that many other factors, certain of which will be dealt with in Chapter IV., than the presence of the specific bacillus have to be considered; in other words, as Sir Dyce Duckworth * has concisely expressed it, the host as well as the parasite has to be reckoned with.

* The Clinical Importance of the Personal Factor in Disease, by Sir Dyce Duckworth, M.D., LL.D., Edin. (Sonderabdruck aus der Berliner Klinische Wochenschrift 1902, No. 16.)

CHAPTER III.

THE DEGREE OF PERSONAL COMMUNICABILITY OF
PULMONARY TUBERCULOSIS.

The evidence adduced in the first chapter went to show that tuberculosis can be inoculated from animal to animal, from man to certain animals, and occasionally from man to man.

But it would not, therefore, be logical to infer, as was pointed out by Héraud* and Cornil in 1867, that pulmonary tuberculosis is communicable from man to man in the ordinary relations of everyday life. There are numerous diseases, such, for instance, as malaria, yellow fever, syphilis, and vaccinia, which are inoculable either directly or through the agency of certain suitable hosts, but which are not "communicable" or "infectious" in the usual acceptance of the term.

Other experiments referred to in the last chapter have shown that tuberculosis of human origin may be induced in certain susceptible animals by compelling them to inhale or perhaps swallow infected dust or droplets, and it has been inferred from such experiments that infection is brought about in similar fashion in the human species.

It may perhaps be said that these experiments, taken together, render it *a priori* probable that the disease is communicable from man to man by like means, but it should be borne in mind that the animals in most of the experiments referred to were highly susceptible to tuberculosis, and that the conditions under which infection is claimed to have taken place were probably far more severe than any likely to occur in the everyday life of the average man or woman.

Also it should be remembered that many of the experiments in question led to very different, often diametrically opposite, results in the hands of different observers; and further that additional experiments by the same observer not infrequently tended to confirm his original results in a way indeed to suggest repetition by him of some governing error of technique or of judgment. Inferences from those experimental researches must, therefore, be drawn with caution.

While, however, fully accepting the proposition that the experiments considered as a whole do make out a strong *prima facie* case in favour of the communicability of pulmonary tuberculosis from man to man, it will be well to turn to evidence of other and perhaps more strictly scientific nature, with the object of determining what is likely to be the *degree* of communicability during

* De la Phthisie Pulmonaire par M. Héraud et M. V. Cornil. Paris, 1869.

ordinary social intercourse. It has to be pointed out that the diseases to which the term "infectious" is usually applied differ very materially in their degree of infectivity; that maladies such as smallpox, measles and typhus fever are credited with a high infectivity, whereas diseases such as leprosy and enteric fever are regarded as possessing infectivity in very low degree. Again, other diseases, such for instance as yellow fever, which were formerly regarded as infectious are now believed to be only communicable by inoculation. And further, before considering the degree of communicability of pulmonary tuberculosis reference must be made to heredity, a condition which has no doubt in the past largely influenced views as to the communicability of the disease.

Formerly it was believed that the tuberculous virus was itself transmissible from parent to offspring much in the same way as is undoubtedly the case with syphilis, and while some approximate value could not be attached to this possible factor in heredity views as regards acquired infection could not clearly be focussed. Unfortunately there is still considerable confusion upon the subject.

The most pronounced advocates of a theory of direct transmission were Cohnheim and Baumgarten, the latter being evidently influenced in this direction by the great prevalence of local tuberculous lesions among children. In his view the essential cause could and often did remain latent until adolescence or early adult life, *i.e.*, until the resistance of the body was so lowered or altered as to encourage the life processes of the micro-organism, and he pointed to the analogy of latency in hereditary syphilis in support of his thesis.

Some degree of probability has been held to have been imparted to this view by the experiments of Landouzy and others. These tended to show that although tuberculous lesions could not be detected in the tissues of the newly-born infant of a tuberculous mother, some of such tissues when inoculated into susceptible animals gave rise to tuberculosis.

It may also be added that, according to Jani, tubercle bacilli have been found in the testicles or seminal vesicles of men dead of phthisis, even although such organs were free from tuberculous disease.

The analogy of *pébrine*, a microbial disease of silkworms, has also been appealed to in support of Baumgarten's theory. The cause of this disease may be transmitted to and remain latent in the eggs produced by the mother moth; and though the worm after it is hatched may pass satisfactorily through several of its phases its development is in the end arrested, and at death the specific microbe is found in abundance in its body.

On Baumgarten's theory "tubercle is a sort of *pébrine* of the human race; the inherited germ becoming incorporated with the ovum, but not destroying it and not producing obvious

disease till a more or less advanced stage of development is reached, while, like the silkworm disease, it has also another mode of transmission by external contagion."

The foregoing passage is taken from a Presidential address* on Tuberculosis, delivered before the Epidemiological Society by Dr. Frank Payne, who on that occasion regarded the disease largely from the standpoint of the actual transmission and survival of the tubercle bacillus. He pointed out that the main object of the tubercle bacillus, as of all parasites, is the continuation of its species: that if tubercle transmitted from parent to offspring developed at once and killed its host, the chances of the bacillus continuing its existence would be materially less than would be the case were the disease to remain latent until by the marriage of the person harbouring it the parasite obtained opportunity of reproducing itself by parental transmission through the agency of a new series of hosts. Children, he observed, do not as a rule expectorate, and hence the development of the bacillus in the child would afford the parasite but few opportunities to reach, through the sputum, a fresh host and thus to ensure its existence for another generation.

As Dr. Payne himself expresses it:—

"On the whole, then, from the point of view of the tubercle bacillus the production of infantile or congenital tuberculosis is not a hopeful direction in which to propagate its race. Bacilli which have this habit of early development would die out, and the continuance of the species bacillus would be arrested so far as that particular strain was concerned."

And he adds:

"If we suppose that this late development or prolonged latency were a sort of *habitus* of the parasitic micro-organism, we may see, on the principle of natural selection, that this habit might become permanently fixed in the bacillus. For those which developed late would have a much better chance of perpetuating their race than those which developed early; the latter, indeed, soon dying out. Thus the property of prolonged latency might become a permanent feature in the biology of the bacillus."

In this connexion some researches on hen's eggs conducted by Maffucci† are both suggestive and instructive. By introducing into impregnated eggs certain species of bacteria which were known to affect the adult fowl he found that such bacteria were unable to grow in the tissues of the embryo, but that when the eggs were hatched they commenced to multiply. Apparently, the embryonic tissues inhibited the growth of the bacilli but did not kill them. As regards the tubercle bacillus, Maffucci found that when the bacilli of fowl tuberculosis were introduced into an impregnated egg they remained latent without injuring the embryo; but that the young chickens when hatched became in many

* On Tuberculosis as an Endemic Disease, by Joseph Frank Payne, M.D., F.R.C.P., President, Vol. XII. Transactions of the Epidemiological Society, 1892-93. Williams & Norgate, London.

† An account of Maffucci's researches are to be found in Baumgarten's Jahresbericht über pathogene Mikro-organismen, 1887, p. 385; 1888, p. 180; 1889, p. 288.

cases, after the usual period of incubation, affected with typical tuberculosis.

As it is not now practicable to enter more fully into this most interesting speculation, Dr. Payne's final statement with regard to it may be given. He says :—

"I have presented this doctrine of direct hereditary transmission of the tubercle bacillus as it is stated by its supporters, because, though by no means proved, it seems to be the only alternative or supplement to the theory of contagion in explaining the continued existence of the bacillus as a parasite, and the consequent endemic continuance of tubercular disease.

"It certainly seems to explain better than any other hypothesis the rare occurrence of foetal tuberculosis and possibly a good deal of the tubercular diseases in early life. But to regard it with Baumgarten as the main factor accounting for tuberculosis in adults seems to me an exaggerated way of looking at the question. Other facts which make against this explanation are the liability to phthisis of foreign races of mankind (*e.g.*, negroes) and wild animals kept in confinement when they are brought into a tuberculous population such as that of England."

It must suffice to add that the generally accepted belief at the present moment is that although there are on record numerous instances of direct transmission in cattle and a few in the human species of tubercle per ovum, the occurrence is relatively so rare that in general considerations as to the etiology of tuberculosis this method of infection may be regarded as of relatively little importance.

Although this is the prevailing view as regards the direct inheritance of the bacillus, there is a large body of opinion as well as some evidence, pointing to transmission from parent to child of a "proclivity," or "vulnerability" of tissue prone to prove a suitable "soil" for the growth of the bacillus. But, in the absence of a well-organised system of disease recognition and registration, it is difficult to procure statistics in this connection of definite validity. It is, of course, possible to take at random a large number of cases of consumption, and by a careful scrutiny of their family histories to determine what percentage have and what percentage have not a family history of the disease. But if it be accepted, as appears probable, that the large majority of adults have had subsequent to birth multiple opportunities of becoming infected, there would be almost insurmountable difficulty in differentiating hereditary from acquired phthisis.

Numerous figures have, however, been collected which are held to afford evidence of transmission of hereditary tendency to phthisis. For instance, 48 per cent. of the cases investigated in this sense by Dr. Theodore Williams afforded evidence of family predisposition, while Pollock estimated the proclivity factor at 30 per cent.; Quain at 25 per cent. Francis Galton, in his work on "Natural Inheritance," places the figures at from 26-28 per cent. Walsh found that 26 per cent of hospital patients came of one or two tuberculous parents, but he did not regard this percentage as sufficient to justify the inference of

hereditary influence. He came to the conclusion that "much phthisis is, in each generation, non-hereditary."

In the first annual report of the Brompton Hospital for Consumption which has been lent to me by Dr. Theodore Williams and which deals with the years 1842 to 1848 it was found that amongst 1,010 consumptive patients 246 or 24·5 per cent. were the offspring of patients who had suffered from the same disease, *i.e.*, about one in four of the patients came from a consumptive stock.

By way of comparison the figures relative to the hereditary influences of insanity were furnished in the same report and these went to indicate that the disease was hereditary in nearly 12 per cent. of the males observed as against 18 per cent. in the case of consumption, while as regards females the percentage in insanity was 13·5 per cent., in consumption 36 per cent.

In view of the difficulty of adducing statistical evidence which can be regarded as convincing, an appeal may be made to the authority of those who from their experience should be most fitted to arrive at a correct conclusion in this matter.

Felix von Niemeyer,* writing in 1866-7 in the "*Berliner Klinische Wochenschrift*," states:—

"Quite as decidedly as we have opposed the evidence that *tuberculosis is inheritable* must we pronounce in favour of a frequent occurrence of an *inherited predisposition to pulmonary phthisis*. But even here what is transmitted is not the disease itself but a weakness and vulnerability of constitution which in the parent has already been the cause of pulmonary phthisis, or has been developed in them by the disease."

Villemin, in his "*Études sur La Tuberculose*," published in 1868, summarises the evidence as indicating that "the only influence which heredity can be held to exercise is that of the transmission of an aptitude, more or less marked, to contract the disease."

Reginald Thomson, in his "*Family Phthisis*," furnishes a table relative to 80 families, with 385 children, of whom 50 per cent. were tuberculous; and Austin Flint refers to 13 families with 91 cases of phthisis, seven of which families yielded as many as 56 cases.

West regards "family predisposition" as an "essential fact."

Dr. Arthur Ransome, F.R.S., thought, in 1890, that—

"Few medical men who have been long in practice will doubt the existence of family predisposition to tubercular disease. Thus, most of us have seen instances of families in which almost every member has died of the disease, and others in which members of the same family, living in different and sometimes far distant places, have yet most of them ultimately succumbed to it. Yet it is quite possible to make too much of this tendency."

* "*Clinical Lectures on Pulmonary Consumption*." New Sydenham Society, 1870.

Dr. Payne, in his inaugural address before the Epidemiological Society on November 16th, 1892, stated that—

"The heredity of tubercular disease is a vast problem which can only be briefly touched upon here; but the broad fact that the children of tubercular parents are, on the whole, more likely than others to become tuberculous has never been doubted, at least in modern times."

In Dr. Burton-Fanning's view* :—

"To speak of there being no such thing as hereditary susceptibility to the disease appears to me to be contradictory to every day experience as well as to the deliberate opinion of all previous writers on the subject. It is argued that the supposed examples of hereditary predisposition to pulmonary tuberculosis were in reality instances of ordinary infection from a parent or other relative. But this contention fails to explain the so-called "family phthisis," which is a well observed condition. It may be that neither parent was consumptive, yet child after child on attaining a certain age falls a victim to the malady, and this notwithstanding the fact that the family has broken up and separated, and that no one home has been occupied by all the members."

As to the existence of conditions of the body or "soil" prone to promote or to resist the multiplication of the tubercle bacillus, there can be little question, and this aspect of the tuberculosis problem has already been referred to in the previous chapter. The marked immediate improvement which so frequently manifests itself while a patient is undergoing treatment in a sanatorium, and the recognised tendency of the disease to run a rapidly fatal course in some people notwithstanding the best conditions, while in others an extreme chronicity obtains, all point, it would seem, in this direction. It is said, too, that certain races, such as the Negro and the Irish, are peculiarly susceptible to tuberculosis, whilst the tendency of the disease to develop in individuals after exhausting disease or conditions such as influenza, measles, enteric fever, and pregnancy would appear to accentuate the importance of this soil factor. Certain animals, such as dogs and cats (notwithstanding their domesticity), are highly refractory to the disease, while rodents, such as guinea pigs and rabbits, are highly susceptible.

In view of the transmission of family features, colour, albinism, habits, &c., from parent to offspring, there would seem to be no difficulty in regarding it as possible that a proclivity towards such diseases as cancer, tuberculosis, gout, and hæmophilia is also transmitted.

In this connection reference may be made to a recent preliminary research by Professor Karl Pearson, F.R.S., as to the hereditary transmission of proclivities. From the data which he has so far collected he is convinced that heredity plays a large part in the effective sources of tuberculous disease, and he thinks, with an increasing number of other observers, that "the discovery of the possibility of phthisical infection has led to under-estimation of the hereditary factors." In his view there

* "The Open-Air Treatment of Pulmonary Tuberculosis." By F. W. Burton-Fanning, M.D. Cantab., F.R.C.P

are probably few individuals who lead a moderately active life who can escape an "almost daily risk of infection under urban conditions ; but in the great bulk of cases of predisposition, a phthisical diathesis must exist to render the risk a really great one. . . . The recognised importance of modern views as to the nature of phthisis would be dangerous if throwing all weight on environment they lead to the disregard of the inheritance of diathesis as being in the bulk of cases an essential preliminary condition." Professor Pearson on a basis of the full records of 383 stocks in which cases of pulmonary tuberculosis had occurred, and which were collected for him by Dr. W. C. Rivers of the Crossley (Manchester) Sanatorium, concludes that "the diathesis of pulmonary tuberculosis is undoubtedly inherited, and that the intensity of the inheritance is comparable with that found for normal physical characters in man. A theory of infection does not account for the facts, and there is an anti-social disregard for national exigencies in the conduct of medical men who can write in the press that the marriage, or even intermarriage of members of tuberculous stocks is of no social detriment provided they live with a good supply of fresh air." (Studies in National Deterioration.*)

The difficulty of "proving" this transmission of proclivity to phthisis obviously increases with the value which one or another observer is disposed to place upon the factor of infection. The extremists who rank its infectiousness with that of small-pox can obviously contend that it is all a question of infection, as also can those who ascribe cases of sudden acute tuberculosis to association with a tuberculous person perhaps four or five years ago. Similarly, on the assumption of latency, all active cases may be ascribed to infection contracted many years, perhaps decades, previously.

But, all things considered, Dr. Horton-Smith-Hartley's view, as expressed in the third edition of Quain's Dictionary of Medicine, that until "more definite proof is forthcoming one must believe that *the hereditary factor in the disease*, which cannot be gainsaid, though it doubtless does not exist to the extent once imagined, is *the result of a special idiosyncrasy of the tissues, whereby in certain families they become more than merely favourable to the development of the tubercle bacillus*," may be provisionally accepted as setting forth the prevailing professional opinion.

And now it will be well to examine the evidence as regards communicability from what may be termed an epidemiological standpoint. In what manner and to what degree does the behaviour of pulmonary tuberculosis at the present day justify the belief that the disease, under anything approaching wholesome circumstances, possesses other than a low degree of personal communicability ?

* Published by Dulau & Co., 37, Soho square, London, W. Price 3s.

Hospitals and other institutions for the treatment of tuberculosis should prove, it will probably be conceded, the most likely sources of evidence under this head ; more particularly so as, prior to the last ten years, the belief in the personal communicability of the disease took shape rather as a pious opinion than as a conception based upon definite evidence. Probably in these institutions no very efficient disinfection of sputum was undertaken and certainly no precautions relative to droplet infection were formerly practised.

In Dr. Samuel West's words :—

"It is fair to say, at the outset, that if phthisis was eminently contagious the proof of it ought to be overwhelming considering the frequency of the disease.

If phthisis were a contagious malady we should expect to find the clearest proof of it among those who are placed in close relation with the sick, *e.g.*, among married couples, among nurses and doctors, and among inmates of the same house or institution. The problem is very complicated, for, quite apart from the question of contagion, there is clear evidence that external conditions, such as place and mode of living exercise an important influence which it is very difficult to eliminate."

Ransome expresses the same idea when he says :—

"That if the simple contagion theory were true hospitals for consumption should have been, at any rate in the past, centres and hot beds of infection ; but the universal testimony of physicians to these institutions is that no conveyance of the disease can be traced to any such institution even before the practice of disinfecting the sputum had been carried out."

That under the circumstances which obtained in consumption hospitals in the latter part of the nineteenth century, there were in the popular view as to the communicability of the disease ample opportunities for house physicians, nurses and ward maids to become infected will, I think, be allowed, and it is clear that the members of the staffs, as a whole, were at an age-period when the incidence of pulmonary tuberculosis is a heavy one on the population generally. Hence, it is to be anticipated that, given a considerable number of nurses, ward maids, &c., concerned with phthisis, it will be only in accordance with expectation that, on the basis of the risks of phthisis which obtain at that age-group upon the population as a whole, a certain number of these persons should develop the disease during their sojourn at the institutions.

Now the actual experience of hospitals for consumption, *i.e.*, of institutions where alone the communicability of the disease, can be tested in the absence of disturbing factors, is to the effect that, under the conditions which formerly obtained and which obtain now, the disease would appear to possess the lowest communicability of any of the infectious diseases. On this evidence, indeed, it might be held that, if the communicability or non-communicability of the disease be determined solely by the experiences of consumption hospitals and sanatoria in this country, there is difficulty, having regard to the widespread character of the disease, in accepting a proposition that phthisis is in any degree

personally communicable. It will, of course, be contended by those who view the infectivity of pulmonary tuberculosis as on a par with that of small-pox, and there are still some who take this view, that by certain precautions taken at hospitals and sanatoria the infecting material is destroyed, and that, therefore, no danger is to be anticipated. But there are obvious difficulties in accepting this explanation of the facts, seeing that much of the evidence as regards the immunity from pulmonary tuberculosis of hospital staffs was, as will presently appear, accumulated at a date anterior to the practical belief in infectivity of the disease, and, therefore, prior to any serious precautions being taken.

In illustration of the remarkable immunity from phthisis of hospital attendants it is necessary to refer once more to the classical instance of the Brompton Hospital for Consumption. In the *British Medical Journal* of September, 1882, Dr. C. Theodore Williams set forth the experience with regard to the staff of this hospital, and his paper has been thus ably summarized by the great epidemiologist Hirsch in his classical *Treatise on Geographical and Historical Pathology* :—

“The hospital has been in existence since 1846, in which year it was opened with 90 beds; in 1856 the number of beds was increased to 200, and in 1873 to 240. Three-fourths of the patients suffer from phthisis in its various stages, the remainder being admitted for bronchitis, pleurisy, empyema, chronic pneumonia, and the like. Previous to 1877 the left wing was ventilated most imperfectly; since that year, however, the extraction of foul air has been well performed. The spittoons of the patients are changed two or three times a day, but until lately no attempt was made to disinfect them unless the odour was unpleasant. The outpatient department was, until the winter of 1881–82, situated in the old hospital, and was much too small for the number of patients, who averaged 200 to 300 daily, mostly phthisical. This large concourse must, on the theory of infection, have proved a considerable source of danger to the assistant physicians, to the clerk who entered their names, and to the porters who marshal them and keep order. ‘The deficiency of ventilation,’ says Dr. Williams, ‘must have led to a large accumulation in the wards of the products of respiration, and also our friends the bacilli. We consequently ought to have seen an extension of the disease to non-consumptive cases or to the nurses; but nothing of the sort occurred—only the usual results of hospitalism, *i.e.*, erysipelas and sore throat.’ Among the physicians, assistant physicians, clinical clerks, nurses and others, to the number of several hundred, who had served in the hospital (not a few of them having lived in it for a number of years continuously), phthisis had not been more common than it may be expected to be on the average among the civil population of a town;

and only in three or four cases could the outbreak of it be brought in any way in connection with the individual's residence in the hospital. 'The evidence of large institutions for the treatment of consumption, such as the Brompton Hospital, directly negatives,' Dr. Williams concludes, 'any idea of consumption being a distinctly infective disease like a zymotic fever.' He admits that in his private practice a few cases had occurred of phthisis ensuing in those who had been in very close intimacy with consumptives; 'but when we bear in mind the far greater number of examples of consumptives living in close intimacy with healthy people, in such relationship as husband and wife, mother and daughter, or sisters sleeping together, where no spread of tuberculous disease has taken place, we must admit that the negative evidence against infection greatly preponderates over that of the very few positive instances.'

Commenting on this Brompton experience Cornet, who, largely on the basis of his experiments with infected dust, has been led to take the view of an advanced contagionist, thinks that "the figures are in the first place too small, and that in the second place, the persons constituting the material were kept under observation for far too brief a period." As regards the immunity of physicians, Cornet maintains that the danger incurred by them is not so great as is that to the nursing staff; in his view the physicians have only brief communications with the patients, and that, too, at a time when the atmosphere of the wards is fairly free from germs. Probably, however, the experience of house physicians in England would be to the effect that they find themselves visiting the wards at all times during the day and night, and that, on the droplet theory of infection, they must be frequently exposed to the inhalation of freshly voided tubercle bacilli caused by the intentional coughing of the patients during the examination of their chests, and the frequent and unintentional explosive outbreaks of cough to which they are liable.

It may be well, too, to describe the experience of certain well-known institutions in other countries* :—

At Falkenstein, during 10 years, 225 non-tuberculous friends accompanying patients have stayed at the sanatorium; many have stayed for six months, and no case of infection has been observed.

At Görbersdorf, where during 40 years 25,000 tuberculous persons have been treated in three sanatoria, pulmonary tuberculosis among the inhabitants in the village, notwithstanding the

* "Le voisinage d'un établissement dans lequel on soigne des malades tuberculeux constituent-il un danger pour les personnes qui habitent les propriétés ou les maisons y attenant?" Par le Dr. P. Brouardel, Professeur à la Faculté de Médecine de Paris, Membre de l'Institut. Annales, D'Hygiène Publique et de Médecine Légale. Mai. 1906.

fact that during the last 30 years the population has nearly doubled, has, according to the figures furnished by Dr. Nahn, which, of course, are very small, apparently decreased.

Years.					Deaths from Tuberculosis.
1856-1859	...	...	...	...	7
1866-1869	...	...	...	...	4
1870-1879	...	...	...	...	5
1880-1889	...	...	...	...	5
1890-1897	...	...	...	...	3

The same writer has made investigations on similar lines with regard to the village of Falkenstein. From 1856-1876—before the sanatorium was opened—the mortality from tuberculosis was 18.9 per 100 deaths, while, since the opening, from 1877 to 1894, it has fallen to 11.9 per cent.

At the Friedrichsheim hospital at Berlin,* out of 459 male nurses only four were phthisical, and two of the four were phthisical before entering the service; and out of 339 female nurses, only two became phthisical, *i.e.*, a rate of only 0.6 per cent.

As regards American experience Dr. Trudeau† states that at Saranac Lake no nurse, attendant, or servant has ever contracted phthisis.

To these experiences may be added that of the Ventnor Hospital for Consumption and Diseases of the Chest, in respect of which Dr. P. Robertson, one of the honorary physicians, has kindly furnished me with a very valuable report, affording the following data:—

In the 22 years, 1881 to 1902 inclusive, at least 15,500 tuberculous persons were treated within its walls, and more than half of this number were what are sometimes spoken of as third-stage cases.‡ The officers, nurses, and servants occupied rooms in the same building as the patients. During the 22 years in question 678 persons of all ranks have been engaged in the institution, and they may be commonly classed in the following fashion: 62 officers, 208 nurses, 407 housemaids, and one charwoman—total 678. Of the 62 officers there has apparently never been the least suspicion that anyone of them has contracted phthisis in the institution during the 22 years to

* West's "Diseases of the Organs of Respiration," p. 457, Vol. XI.

† "Consumption and Civilization," by John B. Huber, M.D., J. B. Lippincott & Co., Philadelphia and London.

‡ *i.e.*—Were cases of "open" pulmonary tuberculosis, ejecting droplets and giving rise to tubercle-infected dust.

which the figures relate. Among the 208 nurses there were apparently six cases, with two deaths, but the evidence seems to show that at least three of the six suffered from the disease on admission. Of the 407 housemaids (brought into contact, some may contest, at least in the earlier years of the period to which this record relates, with infected floors, walls, &c.) none are known to have died from tuberculosis. One, however, who married a phthisical hospital patient was subsequently reported to be consumptive, and there are records, among the remainder, of two cases of pleurisy and one of phthisis; all three are still alive.

Dr. Rufenacht Walters, the author of "Sanatoria for Consumptives," has been good enough to send me the following statement relative to the staff at Crooksbury Sanatorium. Beginning with the medical staff he states :—

In addition to myself there have been five assistant medical officers, two of whom only stayed a short time (under three months). None have become tuberculous either here or after leaving here. One of those who stayed a very short time was already slightly affected with tubercle on admission and left in good health. One of those who stayed more than six months had a phthisical sister here under treatment but was not himself tuberculous. Both he and the other two were here some time, and are at present hard at work and free from tubercle.

Since May, 1900, there have been employed here, in addition to temporary help, 76 servants, 12 housekeepers, and 14 nurses and sisters in charge. Of these, 42 servants were here for three months or less, 25 from three to 12 months, 9 from 12 to 24 months. None were tuberculous either on admission or on departure, and so far as known are in good health—with one exception. This was a maid who, after being for some time at the sanatorium, entered our service at the doctor's house and remained another year or two. She was in extremely good health when she left, but we were informed after a year or two that she had developed consumption and entered Victoria Park Hospital as a patient. She subsequently married and has recently had a child and is said to be in good health again. Of the 26 housekeepers and sisters in charge, two were here for quite a short time. Of the rest, one was slightly tuberculous before admission, but showed no trace of it on departure and is holding a responsible post elsewhere.

Another (a nurse) was the subject of well-marked pulmonary tuberculosis on admission, and after more than a twelve-month resigned to take a rest. Two more nurses had been under treatment for consumption elsewhere before admission. They were with us for more than two years; one left us in much better health than on admission, and is well and at

work. The other (a complicated case) broke down and died a few months after admission.

Of the remaining 20, there has been no evidence of tubercle either when here or subsequently. We are in touch with a large number of them, and when last heard of they were in good health. This is also the case with a number of nurses who are on temporary duty.

It remains to be noted that during the last five years I myself have visited numerous sanatoria and hospitals for consumptives, several of the latter tracing back their history far into the nineteenth century. At the greater number of these institutions I have made inquiries as to the occurrence of cases of tuberculosis amongst the staff which could reasonably be regarded as attributable to infection derived at the institution. In the vast majority of instances there has been nothing to record, although members of the staff have not infrequently been able to speak of an experience of over a quarter of a century, and in no one instance have I procured information which would point to any other conclusion than that to be derived from the Brompton, Ventnor and other records. I have, on the other hand, frequently found that the medical officers and nurses at the institutions have themselves suffered from tuberculosis prior to becoming medical officers, and that they have selected this method of practising their profession owing to the belief that their best chances of avoiding relapse or fresh infection were to be found in sanatorium life, notwithstanding the fact that on theoretical grounds their intimate relations with patients with "open" tuberculosis must inevitably, upon the hypothesis of infection, expose them especially to risk, seeing that these officers have already demonstrated, by developing the disease, that their tissues afforded a favourable nidus for the tubercle bacillus.

It will be of interest to compare the behaviour, as regards the communicability, of pulmonary tuberculosis in hospitals, &c. with that displayed in similar institutions by enteric fever, the infectivity of which is generally regarded as the lowest of any of the acute exanthemata. Here again institutions are likely to afford the most trustworthy testimony, as in the homes of the patients it is always difficult to eliminate the continued operation of the possibly non-personal cause which gave rise to the first case.

In a paper on the infectivity of enteric fever, which was read by Dr. E. W. Goodall before the Epidemiological Society on 20th April, 1900, the author furnished a table showing the number of cases of enteric fever which had occurred amongst the staff of the Metropolitan Asylums Board's fever hospitals from 1892 to 1899; and I have been able, by reference to the annual reports of that Board, to bring the figures up to a later date.

The following table shows the number of cases of enteric fever admitted year by year into the hospitals of the Metropolitan

Asylums Board, and the annual number of cases of enteric fever occurring amongst the staff:—

Year.	Cases of Enteric Fever among the Staff.	Cases of Enteric Fever Admitted.	Year.	Cases of Enteric Fever among the Staff.	Cases of Enteric Fever Admitted.
1892 ...	13	430	1899 ...	11	153
1893 ...	11	544	1900 ...	28	994
1894 ...	7	534	1901 ...	28	599
1895 ...	11	661	1902 ...	20	1420
1896 ...	10	600	1903 ...	4	523
1897 ...	7	664	1904 ...	12	750
1898 ...	10	869	1905 ...	13	586

Of the cases which occurred between 1892 and 1899 inclusive, 29 were recorded at the Eastern Hospital, and Dr. Goodall gives the following particulars as to them:—

One assistant medical officer, 5 charge nurses, 11 assistant nurses, 7 ward maids, 1 ambulance nurse, 1 laundry maid, and 3 members of the adjoining ambulance station. Of these, the assistant medical officer, 3 charge nurses, 9 assistant nurses, and 5 ward maids were employed in the enteric fever wards when they contracted the disease.

In the discussion which followed Dr. Goodall's communication, Dr. Foord Caiger, medical superintendent of the South Western Hospital, stated that there had been, in the nine years during which cases of enteric fever had been admitted into his hospital, 23 attacks of this disease among the staff. All but one of them was a nurse, and with one exception every one of such nurses was at the time of attack working in the enteric fever wards.

Dr. Goodall, commenting upon the statistics in his own paper, observed that "for every 100 cases of enteric fever admitted into the hospitals of the Metropolitan Asylums Board, 1·6 persons on the staff contracted the disease; while for scarlet fever and diphtheria the figures are 0·6 and 1·3 respectively." Although Dr. Goodall very rightly declines to lay much stress upon these figures, having regard to the age distribution of the staff, such figures are nevertheless highly instructive as regards the infectivity of enteric fever.

As regards the infectivity of typhus fever as measured by its incidence on the attendants in hospital, the extract from

Murchison's "Continued Fevers" furnished in the footnote* below may be consulted. The manner in which small-pox nurses, who are not properly protected by vaccination, contract small-pox, is a matter of common knowledge.

In contrast with this negative evidence as regards spread of phthisis in public institutions devoted to treatment of this malady, there are the data relating to the Prussian Nursing Orders, published by Cornet of Berlin in Part I., Vol. VI., of the *Zeitschrift für Hygiene*, and which relate to the 25 years prior to 1889. The members of the Catholic Nursing Orders in Prussia bind themselves to render lifelong service to the cause to which they have adhered; they are, it is said, unable to leave it even owing to ill-health, *i.e.*, they presumably live and die in the service.

The average yearly population of the 38 convents selected for the completeness of their records, was 4,028, figures which Cornet regards as representing a total of 75,450 years of human life, with 2,099 deaths. It was found that in each convent by far the greater number of deaths were certified as due to tuberculosis; that, whereas the deaths from tuberculosis among the general population formed only one-seventh to one-fifth of total deaths, some 62·85 per cent. of the deaths in these institutions were attributed to this cause. It is interesting to note that in the convents the relation of tuberculous deaths to deaths from all causes ranged from 18·18 per cent. to 100 per cent., and that at each age group the incidence of phthisis deaths was much higher upon the nurses than upon the general population. It is, moreover, stated by Cornet that the average age at death among the Convent nurses was lower by ten years and lower than that amongst persons engaged in the most unhealthy trades, and this, notwithstanding the fact that the Convent members were certified to be in excellent health when they entered upon their duties. It was found, he states, that in the first half-year of convent life the death-rate was very small, but that it afterwards rapidly increased, attaining its maximum in the third year.

* During the last twenty-three years (1848-70) 288 cases of typhus originated in the London Fever Hospital. Thus:—

Of the nurses and other attendants in wards ...	193	took typhus.
" medical officers " " ...	14	"
" laundresses " " ...	7	"
" servants " " ...	3	"
Patients admitted with Enteric Fever, in wards	23	"
" " Relapsing " " "	4	"
" " Febricula " " "	4	"
" " Scarlet " " "	24	"
" " Other diseases " " "	16	"

Dr. Gardner writes concerning the epidemic of 1847-8 in Edinburgh:—

"In no single instance known to me did a nurse (in the infirmary) who had not had fever previously, remain for six weeks attached to a fever ward without catching the disease."

More information than that afforded by Cornet's paper is desirable before all the inferences of infection which Cornet draws can be accepted. Although it is stated that the health of the nurses on admission was "excellent," more details as regards their actual physical condition appear to be called for. Thus it is at least conceivable that some of these sisters may have elected to shut themselves off from the world owing to a condition of ill-health not detectable by the stethoscope, but which induced in them the belief that their expectation of life was not a long one, or, expressed differently, their adherence to the sisterhood may have been brought about by the morbid condition to which such ill-health had reduced them. Moreover, it is stated that a difference of incidence of tuberculosis upon the nurses of the several institutions, ranging from 18.18 per cent. to 100 per cent., is to be explained by the fact that some of the nurses were engaged altogether or for the most part in surgical work, where certainly very few and usually no cases of lung tubercle were found among the patients. But it is difficult to reconcile this statement with a thesis of infection of Convents, and the question arises :

Was this heavy phthisis tax associated in any of the institutions with the nursing of non-tuberculous surgical cases, and, if so, how far is the fact consistent with a theory of infection in the other instances ?

So dissatisfied was I with the evidence adduced in this paper of Dr. Cornet that I asked Dr. Hamer, whose recognised mathematical ability fitted him in an exceptional degree for the task, to give me his opinion upon the value of certain of the data and arguments contained in the article. Dr. Hamer has been good enough to furnish me with the following observations :—

The argument in Dr. Cornet's "Die Sterblichkeitsverhältnisse in den Krankenpflegeorden" (*Zeitschrift für Hygiene* Band 6) is based upon the application for purposes of statistical comparison of the "mean age at death," a method requiring to be used with much discrimination, and which can only be properly employed under conditions with which the Prussian figures do not comply. The conclusion arrived at that women entering the cloister at 25 or 33 have the expectations of life of women outside at 58 and 62 respectively is indeed quite unwarranted on the figures given.

The particulars Dr. Cornet relies upon were obtained from the Catholic Nursing Institutions of Prussia during 25 years ending 1889. These, he argues, afford a sufficient mass of material for his purpose, and he considers that the results may be trusted, despite the fact that they are not in accord with experience elsewhere, for the reason that in these institutions new arrivals can be followed from entering the cloister until death. Indeed, as he says, "Weder durch Krankheit, noch durch irgend welche andere Verhältnisse ein Austritt erfolgen kann."

The "populations at ages" in the institutions are not given, but they can be calculated by deducing them from the total deaths, at ages, in Table III., together with the "death-rates at ages" in Table IV.*

Thus over 60 there must be				$\frac{10,000 \times 153}{584.13 \times 25} = 105$	inmates.
At	50-60	"	"	$\frac{10,000 \times 150}{193.04 \times 25} = 311$	"
	"	40-50	"	$\frac{10,000 \times 347}{150.08 \times 25} = 925$	"
	"	"	30-40	$\frac{10,000 \times 711}{194.81 \times 25} = 1,460$	"
	"	"	25-30	$\frac{10,000 \times 472}{239.47 \times 25} = 788$	"
	"	"	20-25	$\frac{10,000 \times 243}{216.75 \times 25} = 448$	"
	"	"	15-20	$\frac{10,000 \times 23}{204.68 \times 25} = 45$	"

The age at entry we are told is, as a rule, 18 to 30. "Der Eintritt zwischen dem 18 und 30 Jahre meist schwankt," and it may be assumed for simplicity's sake that newcomers over 30 may be neglected for the purposes of the following argument. If this assumption is unjustified the error introduced will be on the right side, *i.e.*, will tell against the argument. We should then expect the number of inmates who are aged 30-40 at the beginning of a period of ten years (after deducting the deaths occurring between 30 and 40 in the decennium) to correspond with the number of persons in the group aged 40-50.

But from Table III we calculate. Since at age—

50-60 there are 150 deaths in 25 years there must be 60 in 10 years.

40-50 there are 347 deaths in 25 years there must be 139 in 10 years.

30-40 there are 711 deaths in 25 years there must be 284 in 10 years.

Hence by subtracting the deaths in each period of ten years—

No. of inmates aged 40-50 = $1,460 - 284 = 1,176$: whereas the number of such inmates is actually 925.

No. of inmates aged 50-60 = $925 - 139 = 786$: whereas the number of such inmates is actually 311.

No. of inmates aged 60 and upwards = $311 - 60 = 251$: whereas the number of such inmates is actually 105.

The discrepancies shown by this rough method become more considerable if the more correct plan of following through

* These particulars thus obtained will be averages of those at actual points of time during the period of 25 years.

the 1,460 population, at ages 30-40, to age 60 are upwards be adopted, by application of the decennial death-rates at subsequent age periods. It then transpires that at age—

40-50 there should be 1,176 inmates, not 925 as above.

50-60 " " " 1,000 " " 311 " "

60 — " " " 807 " " 105 " "

The figures suggest that there is leakage at the higher ages, and it is clear the inmates are not followed from entrance until death. This being so the further suggestion naturally presents itself that the statistical compartment leaks, so to speak, not merely at one end, the higher age end, but that it may prove not to be water-tight at the other end, the lower age end; and if this is the case, if, in other words, there is some "selection" of persons entering the institutions, the excessive death-rate at the younger ages would readily admit of explanation. And here it should be noted that the large excess in average number of inmates at age 30-40 over the number at 20-30, viz., 1,460, as compared with 788 plus 448, or 1,236, raises the presumption that such excess cannot be accounted for on a simple hypothesis of a stationary population in which death vacancies are filled by admission of newcomers aged for the most part between 18 and 30. On such an hypothesis the average number at 20-30 would exceed that at 30-40 instead of the reverse being the case. It is deserving of note in this connection that in one of the institutions dealt with, No. 4, the figures are said to be affected, though only in small degree, by the fact that a few deaths may be those of Sisters who re-enter the institution because they are ill. "Kehren dieselben bei Krankheit zurück."

The suggestion thus presents itself, despite our being assured that a medical examination is made on entry, that the institutions under scrutiny really constitute a kind of hospital of refuge for nurses whose health becomes impaired, and who are thus no longer able to be out in the world. Another possible explanation of the excess of inmates at 30-40 over those at 20-30 may be forthcoming in a differing age constitution at differing periods in the life history of an institution. In a newly established institution there may, for example, be more young people than in an older institution.

Whether the figures for the younger ages be thus affected or not, those for the older ages show that the use of the mean age at death, in connection with these institutions, is particularly likely to lead to error. The leakage hypothesis serves it may be noted to explain, in large degree how it comes about, despite the startling results yielded by the mean age at death method, that, as Dr. Cornet himself points out, his Table I., columns 24 and 25, give rates of mortality, from all causes and from phthisis, which are not particularly heavy in comparison with those of the Prussian

population at the same ages. Thus, as he says, the general death-rate, ages 15-80, is 1.81, which is only about one-third less than the institution mortality. Such leakage at higher ages does not however afford explanation of the excessive rates of mortality occurring in the younger inmates, but a sufficient explanation of this mortality would be forthcoming if it were found that the inflow which occurs at the lower ages, and notably between 30 and 40 years of age, is in any considerable degree an inflow of persons who return to the institutions because they are ill; *i.e.*, if it should prove that a section of the newcomers is more prone to phthisis than people of the same age in the population at large. And here, moreover, we may perhaps find explanation of the remarkable frequency of death within two or three years of entering the institutions, a phenomenon upon which Dr. Cornet lays much stress, and which is not readily understood on any other hypothesis than one of selection of newcomers; for it would scarcely be expected that the large number of inmates who are, *ex hypothesi*, exposed to infection repeatedly, during say, the first 10 or 15 years of institution life, but who, while sustaining more or less damage to their lung tissues, do not actually die during these earlier years, should not afford more favourable soil for the future ravages of the disease than the figures suggest. If phthisis were comparable with smallpox or measles, the phenomenon would be less startling; but experience of phthisis elsewhere certainly does not suggest that one attack of the disease is markedly protective against occurrence of later developments of mischief with a fatal result after attainment of 30 or 40 years of age.

The absolute unreliability of the mean age at death method may perhaps be most conclusively demonstrated by taking one or two extreme cases. For example, No. 18 'Order,' Table I. has an average number of inmates, 43, and 18 deaths are recorded in 25 years, so that it would appear that the majority of the inmates must be middle-aged women. At least 25 of them (43 less 18) must have lived in the institution for some 25 years, and as we are told few enter under 20, these 25 inmates must at any rate be over 45 years old. Yet we are assured that the average age at death in this institution is 28.88 years. It is obvious therefore, either that women at older ages have been promoted to perform other duties, being for some such reason as this removed from the category of those providing material for the death returns, or alternatively that the average age of those living in the institution is quite a high one.

Or again consider 'Order' 37, where two deaths occurred, say at 35 and 39 (for the average is given at 37), and where the remaining inmates whose average number exceeded 7 (*see* table) remain to live presumably to a ripe old age (the

death-rates at higher ages are recorded as being quite low), while notwithstanding this the average age at death of the whole 7 is given as 37. The mean age at death is in fact as misleading here as in the analogous instance given by Farr of early dying cornets, curates, and juvenile barristers whose mean age at death was under 30 and whom it would be necessary to make into generals, bishops, and judges for the sake of their health.

Another point which needs to be mentioned is the fact that no indication is given by Dr. Cornet of the extent to which the populations supplying his statistical material were actually exposed to the hypothetical special risk involved by attendance upon phthisical patients.

It is stated (p. 72) that the differing incidence of phthisis in different societies shows that it was not solely the duty of nursing the sick, and "*therefore the phthisical, for where is the hospital without phthisical patients,*" which was responsible for the excessive mortality. Beyond this general suggestion, that wherever there is nursing there is phthisis, there is nothing to show that the nursing of phthisis came into question at all. On the other hand it is noted (p. 73) that some of the sisterhoods were concerned exclusively with surgical work, but unfortunately there is nothing to show which these sisterhoods were. Beyond this there is the statement in small print on page 76 that the sisters in Nos. 9 and 27 societies were for the most part engaged in teaching: oddly enough the phthisis mortality among the sisters in No. 9 society is especially heavy—while sisters at ages under 40 suffer to an excessive extent in No. 27 society—the figures are small, but as they appear to be all that we have to rely upon for purposes of differentiating between exposure and non-exposure to risk they deserve notice, and for what they are worth they show that sisters who do not nurse phthisis are more commonly "infected" than those who do.

It does, however, appear that under certain unwholesome conditions pulmonary tuberculosis may exhibit as considerably greater infectivity than is to be observed in this country, and it is alleged that in the Paris hospitals where there is considerable overcrowding of the phthisical patients there is a high incidence of the disease upon the staff. I have not, however, seen a detailed statement as to this point, and no critical examination has therefore been practicable.

Several attempts have been made in this and other countries to determine whether or not phthisis is a communicable disease by appeals to the experience of medical practitioners, but it cannot be said that the data thus collected have thrown much light upon the problem.

The "Collective Investigation Record," of July, 1883, contains a report by the Collective Investigation Committee of the "British Medical Association," upon the communicability of phthisis.

This Committee sent out forms seeking information relative to such cases as had come under the notice of practitioners, and which in their view pointed to communication of phthisis from one person to another; medical men were asked, if they had any such cases to record, to give the date of the observation, the relationship between the individuals concerned, and the presence or absence of family predisposition.

Of the 1,078 replies received more than half (673) contained the word "No," indicating that no case in the sense above referred to had been observed; but affording no details. The remaining 405 returns furnished data enabling the following classification to be made:—

Class 1.—Affirmative observers	...	...	261
„ 2.—Doubtful	...	...	39
„ 3.—Negative	...	...	105
			<hr/> 405

The Committee found it difficult to analyse the evidence in a fashion which could be held to point to any very definite conclusion. The most valuable portion of the investigation is perhaps supplied by data relative to the occurrence of phthisis in married couples. To this further reference will be made. The Committee, after discussing the returns, add that—

“One fact these returns seem to establish beyond any question, and that is that if phthisis is a communicable disease it is so only under circumstances and conditions of extremely close personal intimacy, such as persons sharing the same bed or the same room, or shut up together in numbers in close ill-ventilated apartments.”

Dr. Niven, Dr. Newsholme, and, following them, others, have approached this problem of infection from what may be termed the viewpoint of association. Thus, Niven and Newsholme have for many years past furnished, in their annual reports the history of numerous persons suffering from tuberculosis who have been found upon inquiry to have been associated with, or worked in proximity to, in the factory, workshop or house, some other workman or person who had at the time of the association either definite tuberculosis or a chronic cough.

Notwithstanding the enormous prevalence of consumption amongst the working classes of our large towns at the wage earning period of life, and notwithstanding the abundant chances of some such associations of healthy and sick occurring, the fact of these associations has appealed with great force to those who have studied the cases on the spot and who are capable in an exceptional degree of accurately appraising the value of the several considerations involved. It is not practicable to reproduce the tables referred to in this report, but it may be stated that it is now more than twenty years since Dr. Niven, at that time medical officer of health of Oldham, commenced to accumulate data in this connexion. In his annual report for Oldham for 1886 will be found the results of an investigation into one hundred cases of tuberculosis, and

Vol. III. (1890-91) of "Public Health" contains a detailed account of an inquiry as to the conditions under which the infection of consumption is spread. For further and more recent data reference may be made to Dr. Niven's Manchester reports, 1903-05, where tables will be found illustrating the manner in which numerous cases of consumption have had ample opportunities, upon the personal infection theory, of contracting the disease. In his annual report for 1905 Dr. Niven furnishes certain illustrative cases of this history of infection, and some of these are herewith reproduced :—

Case 708/00—

(R.N.)—æt 25. Labourer. Died July, 1900.

(S.P.N.)—æt 21. Railway labourer. Registered cause of death, phthisis. February, 1902.

(F.E.N.)—æt 26. Railway labourer. Registered cause of death, phthisis. May, 1904.

Case 1038/05—

(M.N.)—æt 24. Ill 2 years. Notified September, 1905.

F.E.N. was the patient's husband ; and the first two were brothers-in-law.

Case 738/00—

(A.B.)—æt 24. A sailor, home for 5 or 6 weeks between voyages. Ill 2 years. His mother, who committed suicide, had bad cough and spit for 2 years up to her death.

Case 781/01—

(E.)—Sister of A.B.—æt 21. Ill 5 months. Tubercle bacilli found in sputum. Brother lived with her between his voyages and probably infected her. Both have since died.

Case 1039/05—

A married sister of the foregoing case. Ill 3 years. Was evidently infected by E., whom she nursed up to her death—1901.

Case 1054/05—

(E.D.)—æt 34. Ill over 6 months, probably several years.

Case 453/03—

Cousin of the above (æt 5) lived next door up to October, 1903, and had been ill there 1 year. He may have infected E.D.

Case 352/99—

(S.D.)—Step-sister of E.D. Ill from December, 1897, lived with her for about a year in 1900-1 and may have infected her. The father and mother of S.D. had died of phthisis about the time she began to be ill.

Case 877/02 was the father of the child (453/03) mentioned above, and died of phthisis about 5 months before the son's disease showed itself.

The man is believed to have been infected by a workfellow.

E.D.'s father was certified as dying of phthisis in February, 1898, and her mother is expected to have died about 11 years previously from the same disease.

It should be added, however, that it is only by a reference to the annual reports of Dr. Niven, Dr. Newsholme, and others that the cumulative value of the whole of the evidence adduced can be fairly estimated.

Dr. Niven has also been influenced in the direction of infection by the detailed study which he has made of the incidence of pulmonary tuberculosis upon persons who have been in the habit of frequenting certain public houses, the theory of infection being that the careless expectoration indulged in by frequenters of certain of these places has accentuated the opportunities of the inhalation of dried tuberculosis sputum. In that connection, too, the relation between alcoholism and tuberculosis should

be borne in mind as well perhaps as the desire for stimulation on the part of the already tuberculous and hence feeble.

Dr. Niven finds by his researches in Manchester that men suffer more than women when engaged in the same class of work, and he regards these differences as due mainly to the circumstances that men expectorate more than women, and that they frequent public houses to a greater extent. Attention has also been directed in Manchester and elsewhere* to the repeated invasion of the same house by phthisis.

Dr. Newsholme attaches great importance to case-to-case infection, and further reference to his opinions will be found in Chapter XXII. It should, indeed, be here mentioned that this question of the degree of communicability of pulmonary tuberculosis is dealt with directly or indirectly in other parts of this volume, and special reference may be made to Chapter XXI. and to Part III.

There is no doubt considerable difficulty in estimating even the approximate value of these "associations" since most of us were we to develop tuberculosis (and how many of us have not already done this?) could probably recall, more especially if we habitually record our doings in a diary, a plurality of opportunities which we have knowingly had of receiving infection, and in all probability such recognised opportunities would, if all the facts were known, prove but a very small proportion of our actual opportunities. Reference may, too, be made to Chapter VI. wherein the difficulties of determining the precise period of onset of tuberculosis are referred to.

The association of existing cases of pulmonary tuberculosis with previous cases of the disease may be due either to an awakening of an old infection or to a re-infection, or, again, it

* In his annual report for 1907, with an advance proof of which he has kindly favoured me, Sir Shirley Murphy comments upon a published illustration suggestive of infection, in which out of 232 deaths from phthisis in a certain district during 1906, 70, or 30·1 per cent., occurred in houses in which one or more deaths from the same disease had occurred in the preceding ten years. He shews, however, that on purely mathematical grounds, and apart altogether from any consideration as regards infection or class distribution of cases, 54 deaths out of the 232 recorded, or 23·3 per cent., is the most probable number which would have occurred in houses in which one or more deaths took place in 1896-1905, i.e., the number to be anticipated on the ground of chance approaches near to the actual number observed; indeed, having regard to the smallness of the numbers, the difference between the percentages is within the range of "probable error."

Sir Shirley points out that if malnutrition, overcrowding, ill-ventilation and similar concomitants of poverty play an important part in the causation of phthisis, it might be expected that quite apart from the infectivity of the disease more deaths would occur in houses occupied by poor persons than in houses occupied by persons well-to-do, and that, were it possible to make allowance for this disturbing influence the proportion of deaths occurring in houses previously invaded, would have been still less conspicuous. As he observes, these considerations render it very improbable that the figures above referred to furnish support for the theory of infectivity.

may not improbably be due to a common source of infection, such as tuberculous milk. Which of these three factors has in any given case been the determining factor depends upon the ultimate solution of several problems which are at present undergoing investigation. For instance, what amount of human tuberculosis may eventually be determined to be of bovine origin, what is the dose required to produce the disease by inhalation or by ingestion of tuberculosis, and is the necessary dose most likely to be acquired by infected droplets or dust or by infected milk? What value too is to be attached to the factor of hereditary proclivities? Until these questions can be definitely answered, the amount of personal infection is very difficult of determination.

Moreover, there is no doubt great difficulty in ascertaining the period of the actual onset of pulmonary tuberculosis. As Portal pointed out :—

“In estimating the starting point of tubercular disease we have often to look for and refer the patient back to early symptoms long forgotten; to an hæmoptysis in youth, or to an attack of hectic which had taken place years before.”

Dr. Samuel West holds the opinion that phthisis is often the result of auto-infection, “so that the date of the commencement of phthisis is not necessarily, or as a matter of fact usually, the date of the introduction of tubercle into the body.”

Still it is difficult to study all the data recorded by Niven, Newsholme, and others, without agreeing that their representation in bulk may have their place in the opposite scale of the balance to that in which the negative evidence as regards sanatoria and hospitals has to be placed.

But, in attempting to gauge the value of these “associations” especial weight should be attached to the evidence as to communicability between husband and wife. The question as to whether or not any given series of exposures to infection is to be regarded as the actual source of infection must be decided upon a balance of probabilities, and having regard to the widespread prevalence of pulmonary tuberculosis and chronic cough, which may well be of tuberculous nature, it is extremely difficult to fairly measure the value of irregular and intermittent associations and to ascertain how far chance may have been operative. But the relation between husband and wife are, as a rule, so intimate and constant both in health and sickness, more especially perhaps the latter, that no study of the problem of infection can well exclude the evidence under this head. Many observers think indeed that no better test of the communicability of the disease could be applied than a study of behaviour under these circumstances.

Many of the recorded cases of possible infection between husband and wife or vice versa are undoubtedly striking; but knowledge of the widespread prevalence of tuberculosis suggests caution lest too great importance should be attached to seemingly positive instances of infection while a large unrecorded volume

of negative evidence is being overlooked. Fortunately the same volume of the Collective Investigation Record (July, 1885) which narrates these suggested positive cases, contains a valuable paper by Dr. G. B. Longstaff, who was asked by Professor (afterwards Sir George) Humphrey, the Secretary of the Collective Investigation Committee, to contribute a communication* calculating the chances that both husband and wife should die of phthisis, apart altogether from the question of personal contagion.

Dr. Longstaff subsequently somewhat expanded this contribution of his to this subject in his well known "Studies in Statistics," which was published by Edward Stanford.

At the outset of his second paper Dr. Longstaff explains that the investigation was undertaken owing to the frequency with which occurrences such as the following had been recorded :—

"A.B., a healthy man, to all appearances free from any phthisical taint, marries a consumptive wife C.D. After a year or two C.D. dies. A.B. is found to be phthisical at the time of his wife's death, and dies of the disease after a short interval."

The inference had been drawn from cases such as these, several series of which have been published, that they only admitted of explanation on the hypothesis of infection of the man by his wife or vice versa. Dr. Longstaff, however, pointed out that phthisis is a very common disease, especially fatal between the ages of 20 and 50, and that hence such cases must occur more or less frequently as a matter of chance. The subject being one of enormous social importance, he set himself to ascertain how frequently such coincidences might be expected to occur as a pure matter of chance, on the assumption that phthisis is *not* a communicable disease; and he submitted his calculations to three competent mathematicians, one of whom was an experienced actuary.

Dr. Longstaff presented the problem thus :—

"Required—To find in how many cases in England and Wales during the decade 1871–80, both husband and wife would die of phthisis, *assuming the chances for married and single to be equal in all respects.*"

Reference must be made to the original documents for Dr. Longstaff's method of approaching his problem, but he showed by the use of the census returns "that in accordance with these *data* and various necessary assumptions we may state that *during the ten years 1871–80 in England and Wales, assuming marriage to have had no influence upon phthisis by selection, infection or otherwise it would happen 4,363 times that both husband and wife would die of that disease.*"

* Calculation of the probability of the accidental and fatal incidence of Phthisis upon both Husband and Wife," by G. B. Longstaff, M.A., M.B., Oxon., M.R.C.P.

As regards the interval between the death of the husband and wife, Dr. Longstaff's researches showed that :—

829 wives would die of phthisis within 1 year of their husbands' death by that disease.

		between 1 and under 2 years of their husband					
742	"	"	2	3	"	"	"
654	"	"	"	3	4	"	"
567	"	"	"	4	5	"	"
480	"	"	"	5	6	"	"
393	"	"	"	6	7	"	"
305	"	"	"	7	8	"	"
218	"	"	"	8	9	"	"
131	"	"	"	9	10	"	"
44	"	"	"	"	"	"	"
4,363							

and he adds, "If the results are anything near the truth, they prove that a far greater number of coincidences of the deaths of both husband and wife within a short interval of phthisis than has as yet been brought forward would be required to prove that one had contracted the disease from the other by infection."*

* A somewhat remarkable series of cases as regards the possible infection of wives by their husbands was contributed to Vol. VII. of the Clinical Society's Transactions by Dr. (now Sir) Hermann Weber,* who recorded "the history of 68 persons, male and female, who with a more or less consumptive taint have married healthy partners. One or several of the partners of 10 out of these 68 cases became consumptive. The question, however, takes a different aspect if the originally tainted husbands and wives are considered separately. Of the 68 persons 39 were husbands, 29 wives. Only one of the husbands became diseased, while the wives of nine out of the 39 husbands became affected. Thus nine husbands lost 18 wives, viz., one lost four wives, one lost three, four lost two each, and three only one each."

The series affords subject for some interesting speculations, but the numbers are, as Sir Hermann Weber points out in a most impartial fashion, too few to deduce any very definite conclusion. One remarkable fact is the chronicity of the disease in the husbands, the average duration of the disease having been well over 10 years, and the striking rapidity with which the wives died after developing the disease. Another instructive feature was the constancy with which the wives developed tuberculosis shortly after one or another of their pregnancies. It would not appear as if in any of the cases the disease in the husbands was at all an active phase, either at the time of marriage or until many years afterwards, and yet, during the whole of this period of latency the husbands were—on the doctrine of infection—inflicting a succession of wives. It is, however, conceivable that the wives were infected through the foetus and not by the infection given off from the husband's lungs, and it is instructive to note that in seven out of the nine cases there was a marked family tendency towards the disease in the husbands. There is also a faint suggestion in the series that wives who do not become pregnant are more likely to escape infection, a view which, if true, might be held to support the view of infection via the foetus in the other cases, or, perhaps, with more force, a view that the disease was latent on marriage in all the women and that the debilitating effects of pregnancy brought a latent into an active condition.

* The Communicability of Consumption from Husband and Wife, by Hermann Weber, M.D., read May 8th, 1874, Transactions of the Clinical Society, vol. vii., 1874.

Cornet, however, does not regard negative instances as evidence against the "contagious" character of the disease, and he thinks that inferences drawn from such cases—Longstaff's work he curiously abstains from mentioning—are "the result of an exaggerated estimate of the intimacy of the marital relation." He seeks to minimise the risks which are regarded as obtaining in the married state by alleging that either the wife or the husband, and especially the latter, is "apt to be kept away from home as much as two-thirds of the day; often man and wife meet each other only at night, and even then they frequently occupy separate rooms, through disinclination, impotence, age, occupation, or other causes" and "the accepted notions concerning the infective powers of a kiss is vastly exaggerated since the saliva is generally free from bacilli, and even if it should contain bacilli they would be carried into the mouth and the digestive tract of the other person and not into the lungs."

These contentions of Cornet are given for what they are worth. But, as regards the carriage of kiss-borne bacilli to the intestines, enough has been said in Chapter I. to indicate that, possibly, this route may be the nearest way to the lungs.

In connection with this question of the incidence—whatever it may be—of pulmonary tuberculosis upon married couples, the factor of what may be termed sympathetic selection should be held in view in drawing inferences with regard to infection, and I am interested to note that Dr. Longstaff made a suggestion of this nature nearly twenty years ago. He terms it "sexual selection" and this is obviously much the same thing as "sympathetic selection." As Dr. Longstaff observes, before attributing what may conceivably be the excessive incidence of pulmonary tuberculosis upon husband and wife to the factor of infection, it would be necessary to examine how this element of sympathetic or sexual selection might not at least partly explain such incidence. It is obvious that a common misfortune might create a common sympathy and that such sympathy might lead to marriage; and it is, moreover, conceivable on the assumption of the existence of a tuberculous type that there may be an unconscious selective element between the sexes in that type. But whatever may be the facts unprejudiced observers will, I imagine, agree with Whitelegge and Newman that "statistics are inconclusive even with regard to transmission of phthisis between husband and wife."

There is, too, another aspect in which this problem of personal infection may be viewed, although it obviously leads to a very broad field of investigation. If, as is commonly believed, tuberculosis is spread mainly by personal infection, the large amount of work which has already been done in certain localities, along with the dread of the disease which is becoming common amongst the public, might have been expected to have already yielded results manifesting themselves upon the death-rate curve

by an increased rate of fall. It will, however, have been seen by a reference to Chart I. in Chapter II. that, in so far as the death-rate for England and Wales is concerned, no such depression has yet been produced; and, indeed, seeing that the preventive measures which have so far been taken have been confined to a few places only, this absence of increasing rapidity of fall need occasion no surprise. On the other hand, it has to be noted that in places such as Manchester, Brighton and Sheffield, in each of which towns a large amount of preventive work has been carried out, it is by no means easy to state decisively from the curves furnished in Part III. that any effect in diminution of phthisis mortality is detectable. But the fact must not be lost sight of that in some cases the preventive measures adopted have not been in operation for a sufficient length of time to enable the result of such measures to become apparent. It should nevertheless be remembered that certain preventive measures have already been in operation in some towns for six years, and that, on a thesis of infection, the saving of a few lives or even the postponement of death should have produced some effect upon a mortality expressed in terms of a death-rate per 10,000 of the population. (Chapter XXI.)

In reply it may be contended that it by no means follows that because no effect upon the death-rate curve has been produced the measures adopted have been unavailing; that it is conceivable that fresh forces may have appeared which are tending to veil the influence of the preventive measures adopted, and that but for such measures the death-rate would either have remained quite stationary or undergone increase. Against this explanation is the circumstance that the death-rate from pulmonary tuberculosis in certain towns where no direct preventive measures whatever have been taken, has fallen as rapidly as has been the case where such measures have been in vogue. This question will be further discussed at a later stage, but it must suffice to state that in so far as the necessary evidence is available, a theory of high personal infectiousness receives but little support from a study of the results of preventive measures. Further, the lack of variation in the behaviour of tuberculosis is difficult of explanation on a thesis of high infectivity. In 1901 Sir Hugh Beevor drew attention to the remarkable *constancy* which obtained year by year in the death-rate from pulmonary tuberculosis in the rural districts of Norfolk, where occupation and population (at ages from 25-45) had remained stationary for 30 years. It is difficult, this author pointed out, to reconcile this constancy with the high capacity for personal infection which is ascribed by some to the disease.

The facts here set forth may perhaps be regarded as pointing to the conclusion that tuberculosis is not a disease which can be reasonably grouped as regards personal infectiousness with the acute exanthemata such as small-pox, and typhus fever; and this position, if accepted, should involve a material difference in administrative action.

Tuberculosis may, perhaps, be best viewed as occupying a distinct and separate position from the exanthemata, and, as regards its duration and low degree of infectivity, meriting a class to itself.

Dr. Sinclair Coghill,* for instance, spoke of consumption as "conditionally infective," i.e., "certain conditions must be present before the infecting element, the bacillus, can initiate the morbid process," and, again, Sir Hugh Beevor† concluded as a result of a close examination of the problem that "the term infectious is too loose a term to apply to both measles and tuberculosis." He suggested that "sub-infectious" is the most appropriate term. Whitelegge‡ and Newman in their text book speak of phthisis as "a true infective disease but a sub-infectious one."

Dr. Hermann Biggs who must, from an administrative point of view, be regarded as the world's pioneer in so far as the actual introduction of reputed preventive measures are concerned, has laid stress upon the importance of differentiating between tuberculosis and the acute infectious diseases. He has definitely stated that the Ordinance which was adopted at New York in June, 1897, specially aimed at placing the disease in a category separate from that class of contagious diseases which includes measles, smallpox and scarlet fever; and in the interesting communication which he contributed to the London Congress in 1901 he pointed out "the difference between pulmonary tuberculosis and the contagious diseases was especially emphasised in the circulars of information," adding: "It seems to me that the difficulties in dealing with this disease have been greatly increased because of the failure of sanitary authorities generally to recognize this distinction. Both to the public and to the medical profession the term 'contagious' conveys a distinct conception of the ready transmissibility of disease from the sick to the well *after slight exposure*. This is certainly not true of tuberculosis."

* The Prevention of Consumption, by Dr. J. G. Sinclair Coghill, *Nineteenth Century*, February, 1899.

† An Address on the problem of infection and immunity in tuberculosis and the issues involved, by Sir Hugh Beevor, Bart., M.D., F.R.C.P., *Lancet*, January 10th, 1903.

‡ Hygiene and Public Health, by B. Arthur Whitelegge, C.B., M.D., B.Sc., London, F.R.C.P., D.P.H., and George Newman, D.P.H., F.R.S.E.

CHAPTER IV.

CERTAIN FACTORS IN THEIR INFLUENCE ON PREVALENCE
OF PULMONARY TUBERCULOSIS.

It will only be practicable in this report to devote a relatively small space to a consideration of this aspect of the tuberculosis problem; to treat of it adequately would demand a separate volume. It is unfortunate, so far as the study of the disease is concerned, that the records of tuberculosis in the human subject do not serve to ascertain the time, if such time ever was, when our race was free from, or immune to, the parasite of this disease. The annals of history go back in relation to this question little beyond Hippocrates, and geological evidence affords no assistance owing to the fact that the vegetable parasite and the soft parts of the human host which it most commonly now affects have left behind them no indication of their existence in the strata in which both parasite and host may have lived and died. Similarly as regards other animal hosts of the same parasite, equally little is known. But, looking at the very wide distribution of the disease in the animal kingdom at the present day, it would not seem improbable that as man developed from the anthropoid ape he carried over with him as an heritage the tubercle bacillus, which in turn may be a degraded form of some higher vegetable organism. It is indeed reasonable to suppose that the tubercle bacillus which is called by the Germans and others the bacillus of "human type" is but a modified descendant of a bacillus which in some form or another exerted in earlier times its influence on species which were sub-human, and this, notwithstanding the fact that there are now some differences in the cultural and inoculable characters of particular strains of the bacilli affecting different species. As to the origin* or gradual evolution of this parasite which is one of the essential causes of tuberculosis practically nothing is with certainty known, and all that is possible is to ascertain so far as may be practicable what are the conditions which make to-day for the co-operation of the individual and the parasite in such a fashion as to bring about the disease.

Whatever such co-operating circumstances may be, the interaction of host and bacillus, in this and many other countries, does

* As Herbert Spencer has expressed it in Vol. I of his "Principles of Biology," the conception of a first organism in anything like the current sense of the words is wholly at variance with the conception of evolution The affirmation of universal evolution is in itself the negation of an absolute commencement of anything. Construed in terms of evolution every kind of being is conceived as a product of modifications wrought by insensible gradations on a pre-existent kind of being; and this holds as fully of the supposed commencement of the organic life as of all subsequent developments of organic life.

not, if the statistics may be relied on, appear to be so close as formerly; the alliance, affinity or interaction between the two appears to be growing weaker.

As has already been shown by charts representing the behaviour of tuberculosis in England and Wales, there are indications that the disease may, ere many years be passed, become an uncommon, if not rare, malady in this country. It may disappear, as not improbably will have proved to be the case with typhus fever, relapsing fever, leprosy, and other diseases, which at the present time, so far as this country is concerned, have little other than an historical interest.

Epidemiologists will, however, hesitate before predicting the final extinction of any disease concerning the precise causation of which there is still doubt. It is true that species, plant and animal, evolve and devolve, flourish and decay, being succeeded by others more adapted to the current environment than those which preceded them. But a study of epidemiology teaches that diseases such as plague, cholera, small-pox, cerebro-spinal fever, and influenza, wax and wane: that they may for a time, if not almost entirely, disappear, and again, for reasons which as yet are very imperfectly comprehended, recrudesce in all their pristine, or even greater, virulence.

It has, however, to be noted that tuberculosis has never exhibited any sudden, or indeed any wide fluctuations in prevalence as indicated by the death-rate, such as has been the case with certain of the foregoing diseases. While with the acute exanthemata cyclic periodicity is not uncommonly a marked feature, chronic diseases, such as leprosy and tuberculosis, have to be regarded as relatively stable maladies in respect to time and place, and this fact alone suggests a line of differentiation between them and the acute exanthemata. Whether diseases such as typhus and relapsing fever will ever largely recrudesce in this country in anything approaching their former virulence is an open question; the answer may depend upon the social conditions of the people, upon the absence of war, famine, and of poverty.

But the manner in which typhus and relapsing fever have, at least provisionally, disappeared has some bearing upon the problem of tuberculosis. Both have practically vanished, though nothing approaching systematic special measures, such as notification, isolation, disinfection, or of curative or preventive inoculation, have been brought to bear against them. And this, although there can be no question as to the infectivity of both diseases; indeed, as Clemow has remarked in his "Geography of Disease" typhus fever is "one of the most directly infectious of all diseases." The prevalence of typhus fever was aforesaid associated with overcrowding, bad ventilation, innutrition, and general insanitation. It prevailed in gaols and institutions wherein now it is practically unknown,

Much the same may be said with regard to the behaviour of relapsing fever; it, too, was associated with overcrowding and insufficient food; it appeared after wars, famines, and pestilences had left large sections of the population in misery and want. It shared with typhus fever the name of "hunger" or "famine" fever, and both diseases disappeared with the improved condition of the people, with the advance of civilisation, with the destruction of the rookeries in large towns, with improvements in gaol and ship life, and generally with adoption of more wholesome administrative methods. Isolation, notification, disinfection could have had little or any share in elimination of these diseases. Both were spread, it is believed, from person to person by air-borne infection, there being no evidence to shew that either malady has been conveyed by the medium of water, milk, or other food, although there are grounds for suspecting that in the case of relapsing fever the spirillum with which the disease is associated may have been conveyed from person to person through the agency of some intermediate host such as the flea or the bug.

It would seem, therefore, that two of the most important air-borne diseases have undergone an altogether phenomenal reduction in the absence of any special measures directed against them, and, if a general view be taken of the behaviour and control of infectious diseases, there would appear to be some evidence in support of a view that means directed against air-borne diseases by measures concentrated upon the air-borne infection itself have not been crowned by any very remarkable degree of success; indeed, in so far as direct preventive action is concerned, defence against such diseases has, it would appear, only been made good when some method of preventive inoculation, such, for instance as by vaccination or diphtheria anti-toxin, has been employed, or when, as in the case of malaria or yellow fever, either the insect hosts which harbour the parasite between one and another human being have been searched out and destroyed or the area inhabited by such intermediary hosts avoided at least during the prevalence of the diseases with which their presence is associated.

It cannot, for instance, be said with any degree of confidence that efforts to control such air-borne diseases as scarlet fever, diphtheria or measles have, so long as efforts have been made to attack their air-borne infection alone, been very encouraging, and there are perhaps certain indications that efforts to attack pulmonary tuberculosis upon an exclusively air-borne conception are not likely to markedly accelerate the rate at which the disease has for many years been decreasing.

It may, therefore, be worth while to ascertain what are the conditions with which the decrease of tuberculosis has been in the past associated in order to determine, if possible, whether a direct attack upon the bacillus is the most hopeful channel for controlling the disease, or whether some of the money available for

the purpose may not be more usefully expended in eliminating the unwholesome conditions with which the prevalence of the disease seems to be inextricably bound up.

Complete study of the etiology of tuberculosis presents enormous difficulties, but there is a good deal of evidence in support of the view that the malady is not due to any one single factor. It is generally apprehended that tuberculosis is a *social* malady, and hence all the fallacies and disturbances that affect problems dealing with social phenomena must influence in some degree theses accounting for tuberculosis.

It has also to be borne in mind that the relative importance of the factors, some of which are now to be briefly considered, has been materially affected by views as to the direct communicability of the disease and by the constant discovery of additional causative or predisposing agents.

As Dr. Niven has expressed it, "it is no easy matter to maintain a steady position among the changing views as to the modes of propagation, and methods of prevention."

THE POSSIBILITY OF A CHANGE OF TYPE IN THE DISEASE.

It has been suggested by Sir Shirley Murphy that in consideration of the several factors which may have had to do with the decrease of tuberculosis in this country, the possibility of a change of type in the disease should not be lost sight of. There can be no question as to the importance of this consideration, and it is matter for regret that the data which might enable us to judge of the value, if any, of this factor are not forthcoming. In the absence of such a knowledge as to the past and present fatality rate of the disease as could be alone gained by a thorough and uniformly enforced system of compulsory notification, it is impossible to arrive at any reliable conclusion on the point. But there are nevertheless certain *a priori* grounds for thinking that the type of the disease may, as a matter of fact, be becoming milder. In the first place the diminishing death-rate from the disease in this country is not inconsistent with this view. Assuming for the moment this diminution to be an indication of the dying out of the disease, a lessening fertility and virulence of the parasite with which the disease is associated would seem to be one of the most important agencies by which extinction might be achieved; indeed, it might be contended that the dying out of a species of micro-organism is in itself an expression of its diminished virulence. Moreover, if it can be shown that light and air are in themselves prejudicial to the tuberculosis parasite, the greater general prevalence of those two germicidal agencies may logically be regarded as tending to promote the gradual devolution of this bacillus. There would perhaps seem to be some presumption in favour of the above

proposition in the behaviour of typhus fever, which when it now occurs, appears to possess a lower virulence and less infective power than heretofore ; but this question is rendered a complex one by the better conditions under which the disease is as a rule dealt with in modern times ; in other words the argument is complicated by the factor of environment. Generally speaking, too, it would seem that scarlet fever is at the present time exhibiting in all parts of the world, and perhaps irrespective of any direct preventive measures, a markedly low fatality rate, and study of epidemiology affords illustration of similar behaviour on the part of other of the acute exanthemata. It is, however, clear that tuberculosis differs materially from diseases such as scarlet fever and typhus fever.

Unfortunately there are but few data available as to alternations in the fatality rate of pulmonary tuberculosis, but it is of course not inconceivable that the enormous prevalence of healed tuberculous lesions which is found post mortem is in itself some evidence of an altered virulence of the disease. There is, however, but little evidence apart from improved treatment, as to whether the disease is more easily curable than heretofore. It may perhaps be said generally that an infectious disease is most virulent on a rising epidemic and least virulent on a falling one, but whether the like is true of such a disease as consumption, I am in doubt. The fact is it is difficult, if not impossible, to measure alterations of virulence as regards this disease without more data than are at present available, and it must suffice to say that a theory of degradation of type would explain some of the phenomena observed.

POVERTY IN RELATION TO TUBERCULOSIS.

Although there are doubtless many factors influencing the prevalence of tuberculosis, there is one that stands out prominently above all others. This factor is poverty, and although it is matter for dispute which elements of poverty are mainly operative, there is much evidence in support of the view that poverty as a whole, with all that it comprises and implies, may be regarded as one of the most, if not the most, potent predisposing causes of the malady.

Poverty acts in many ways ; it may, for instance, diminish resistance of the individual to the disease by promoting overcrowding of persons, semi-starvation, lack of sunlight, of ventilation, and of cleanliness ; it may induce occupational predisposition, and increase opportunities for infection.

The association between pauperism and tuberculosis is brought out clearly by the chart facing page 84, relative to the prevalence of total and indoor pauperism, and the behaviour of the phthisis death-rate in England and Wales, in Scotland and in Ireland. In the two former total pauperism has declined, as also

has the death-rate from phthisis; in the latter* total pauperism has increased and so also has the phthisis death-rate. In all cases there is a general agreement between the behaviour of total pauperism and that of tuberculosis, but it must be pointed out that the effects of pauperism in inducing death from phthisis may be veiled by numerous other influences so that a precise correspondence of the phthisis curve with the diastoles and systoles of the pauperism curve is not to be expected. Moreover, the effects of excess of pauperism and of the conditions which conduce to pauperism are not likely to exert an immediate effect upon the death-rate from phthisis seeing that phthisis is a malady of many months', often very many years' duration.

There are too many other things besides pauperism which have undergone decrease within the last half century, and caution must be exercised before coupling together two factors in the relation of cause and effect, more particularly as in the case of phthisis, the accepted causes of the disease are numerous.

It is, however, in accordance with expectation that the curves of pauperism and tuberculosis should show a general parallelism, and this is a very important point. The immediate advantages which

* The increasing death-rate from tuberculosis in Ireland† in association with a high total pauperism is a subject which has given rise to much discussion and speculation. Question has arisen as to whether more accurate recognition and registration of the causes of death has led to a nominal increase in the death-rate curve, and as to whether the emigration of the fit during so many years has altered the relation between the phthisical and non-phthisical, and thus produced what may in a sense be regarded as a nominal rise only. It is thought by some that this emigration has led to an increased intermarriage between those who are left and hence perhaps to greater hereditary proclivities to the disease. Again, these comments have been met by the criticism that it is the unfit rather than the fit who emigrate, and appeal has been made to the death-rate from phthisis of the Irish in America, an argument which has drawn forth the allegation that the Irish branch of the Celtic race is especially prone both to insanity and tuberculosis, figures being quoted in support of this view. A quotation from an Irish source seems suggestive, more especially so when the intimate relation between insanity and tuberculosis is borne in mind. After a reference to certain American authorities, the inspector observes—

"These observations by authorities on the subject in the United States, read in connection with the statistics of insanity in Ireland, point to the conclusion that the Irish branch of the Celtic race is specially predisposed to mental breakdown, and, therefore, the great increase in the number of the registered insane all over the civilised world is for this, as well as other reasons, very marked in Ireland. As to why this is so we can offer no reasoned explanation; but just as the Irish famine was, apart from its direct effects, responsible for so much physical disease in the country, so it would seem not improbable that the innutritious dietary and other deprivations of the majority of the population in Ireland must, when acting over many generations, have led to impaired nutrition of the nervous system, and in this way developed in the race those neuropathic and psychopathic tendencies which are the precursors of insanity."

† Supplement to Fifty-fourth Report of the Inspectors of Lunacy. A special report on the alleged increase of Insanity by George Plunkett O'Farrell and E. Maswe Courtenay, Inspectors of Lunacy, 1906. Price 5s. 6d.
See, too, page lviii, Sixty-Ninth Annual Report of Registrar-General of England, 1906.

accrue to phthisis patients when they receive more nourishment indicates that it may be mainly through the channel of defective nutrition that poverty exerts its influence.

As regards the influence of poverty as expressed by amount of wage received, reference may be made to the interesting figures published by the late Dr. Reincke, the known medical officer of health of Hamburg, and contained in his annual reports for several years past. In the following table which has been abstracted from the reports in question, the condition *quod* poverty is gauged by the income as shown by the number of taxpayers. The first group has an annual income of 1,200, and the last group one of over 50,000 marks.

Table indicating death-rate from pulmonary tuberculosis in Hamburg among the several groups of income-tax payers (inclusive of the dependants of such tax payers).

Income in Marks.	Death-rate per 10,000 in each class.										No. of the population
	1896.	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.		
900 to 1,200 ...	61.4	81.6	35.6	71.6	78.2	55.4	56.3	56.8	38.8		3
1,200 " 2,000 ...	48.8	48.2	70.9	50.2	61.6	38.7	44.8	41.2	45.1		5
2,000 " 3,500 ...	36.9	37.3	37.7	42.7	29.7	21.5	29.2	29.4	29.4		2
3,500 " 5,000 ...	34.9	28.4	22.5	12.9	15.7	24.5	24.0	32.5	26.9		11
5,000 " 10,000 ...	12.8	22.3	14.8	20.7	20.7	5.7	17.9	12.5	12.0		1
10,000 " 25,000 ...	20.3	12.3	11.4	11.2	30.7	9.8	7.9	20.0	19.7		1
25,000 " 50,000 ...	38.0	10.0	27.5	17.5	17.5	7.5	15.3	—	7.3		1
Over 50,000 ...	—	—	—	—	24.7	—	—	—	—		1

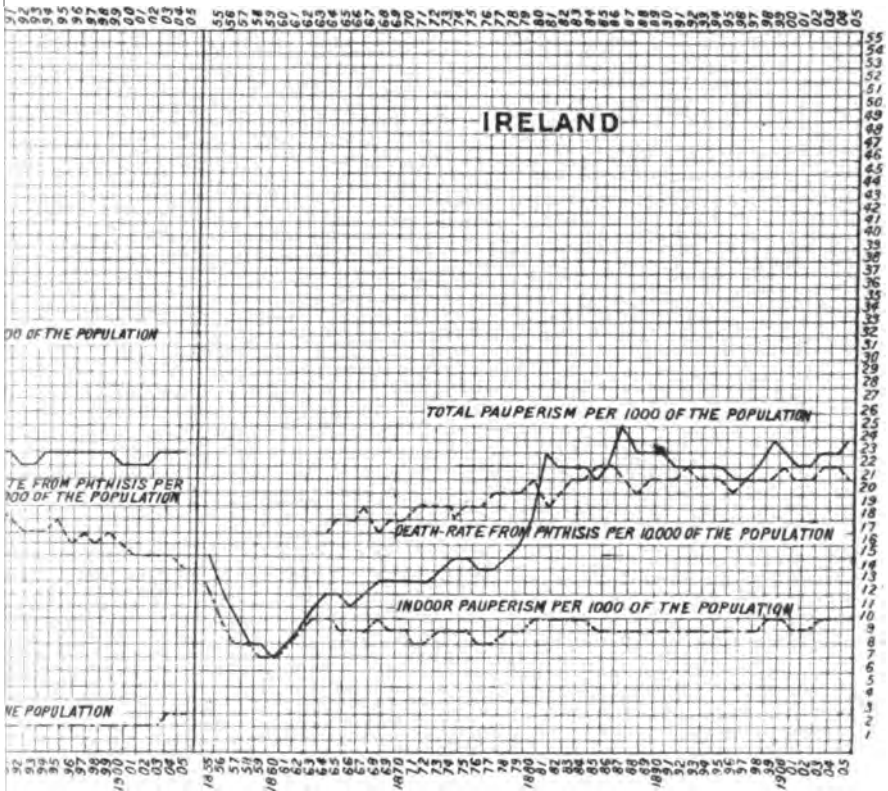
With respect to this table it has to be noted that the deaths in the last four groups are very few in number and that consequently the percentages are not of great value. There is, too, the question of the age distribution of the several groups to be considered, but as to this inquiries from the late Dr. Reincke elicited the opinion that the ages in the several groups are so nearly identical that the rates may be regarded as fairly comparable.

It will be found generally from a study of the table that the death-rate from phthisis varies inversely as the income, although there are certain discrepancies in some of the years, as, for example, 1898, when the incidence on the very poorest group was only about half that upon the group immediately following.

It will be seen, however, that if the average for the several years be taken, that for the most part the incidence varies inversely as the tax, *i.e.*, the lower the tax the higher the incidence.

Evidence on somewhat similar lines was furnished from Vienna at the Tuberculosis Congress in Paris in 1905 by Professor Sternberg. He showed that in the Austrian capital

PHthisis DEATH-RATE AND INDOOR PAUPERISM IN RING THE LAST 50 YEARS.



WILLIAMS & GUNTER LTD. LONDON

the tuberculous mortality in the several districts bore, as a general rule, an inverse relation to the percentage of income tax payers, and curiously enough, a definite relation to the percentage of illegitimate births.

For example, as will be seen by the subjoined table, that as regards the year 1902, in District No. I., which represents the best portion of Vienna, the death-rate from tuberculosis was 11 per 10,000 of the population, the income tax payers amounted to 25 per cent. of the population, and the illegitimate births to 0·8 per 1,000, whereas in District No. X. the death-rate from tuberculosis was no less than 67 per 10,000, the income tax payers 9·2 per cent. of the population, and the illegitimate birth-rate 9·2 per 1,000.

Districts.	Death-rate from Tuberculosis per 10,000.	Percentage of Tax payers.	Illegitimate births per 1,000.
I.	11	25·0	0·8
IV.	22	22·1	2·0
VI.	25	18·2	2·7
VII.	25	19·3	1·8
IX.	28	17·5	3·2
VIII.	29	19·3	2·6
II.	31	18·8	3·4
XV.	35	13·9	3·3
XVIII.	37	15·0	3·8
III.	42	17·4	4·3
XIII.	43	13·7	6·2
XIX.	46	12·6	4·2
XII.	50	10·5	7·7
V.	51	13·1	5·0
XVII.	53	10·5	5·7
XVI.	55	8·5	7·5
XIV.	58	10·2	7·5
XX.	60	10·5	9·9
XI.	63	10·4	7·9
X.	67	9·2	9·2

In our own country, Sir Hugh Beevor has furnished data relative to the price of corn, to pauperism, and to wage earning. These data, he observes, show "a coincidence and a remarkable agreement between the fall in the phthisis rate, the fall in the price of corn, and the fall in the number of paupers and the rise in the money wage."

In so far as the incidence of tuberculosis upon the poor is concerned he adds, "As far as I can trace the well-to-do classes have always suffered much less from phthisis and have not gained a proportionate declension"; a statement which if thoroughly

sound goes to suggest limitations to the influence of improved social conditions in reducing the phthisis death-rate.

As Dr. Niven observes, "we have only to recall to ourselves the widely different incidence of fatal phthisis on poor and on well-to-do districts to perceive that nutrition has much to do with the matter."

But the greater incidence upon the poor of tuberculosis is so obvious that it would be a waste of space to further insist on it. The question, however, naturally arises as to how far the poor are tuberculous because they are poor or are poor because they are tuberculous, and it would obviously be difficult to furnish statistics upon this subject seeing that the working classes from which the ranks of poverty are recruited rarely seek medical advice until their tuberculosis is far advanced.

It is clear that a workman (relatively poor in the first instance) who has a family dependent upon him and who becomes tuberculous independently of poverty, is likely to become poorer in consequence of his tuberculosis; and, further, that his dependant family not improbably having their resistance lowered by insufficient food, poorer housing, and general privation are not unlikely to become in turn tuberculous because they have been poor. This probability would appear the greater the nearer the workman was in the first instance to the poverty line.

Dr. Nathan Raw has estimated that 40 per cent. of certain cases which he has investigated became poor because they were tuberculous, not tuberculous because they were poor, but I have not seen the data upon which the conclusion is based. In any case poverty and tuberculosis are found linked together, and any circumstances which are likely to diminish the evil effects of poverty tend, it may be believed, to lead to a very material reduction in the prevalence of tuberculosis, and in this connection special attention may be directed to the considerations set forth in Chapter XXIII. as also Chapter I. and II. in Part IV: as to the utility, as regards the further diminution of consumption, of the establishment of some systematic scheme, such as obtains in Germany in the compulsory insurance of workmen against sickness and invalidity, whereby the evil effects of poverty are to a very material degree mitigated.

THE RELATION OF ALCOHOLIC EXCESS TO THE PREVALENCE OF TUBERCULOSIS.

That alcohol acts as a predisposing cause of tuberculosis was a belief held as far back as 1780. But in 1849 Magnus Huss declared that the sclerotic action of alcohol on the tissues was actually antagonistic to phthisis, or that, at most, it bore no relation to it.

It is, however, very generally believed at the present day that alcoholic persons are especially prone to develop tuberculosis; the main grounds for this belief being (a) that alcoholism and

tuberculosis are frequently found post-mortem to have been associated, and (b) that the death-rate from tuberculosis among persons such as barmen and hotel servants employed under conditions conducive to alcoholic excess is unduly high.

Although the incidence of pulmonary tuberculosis upon persons addicted to alcoholic excess is a high one there are difficulties in the way of complete acceptance of the proposition that the association between alcohol and tuberculosis is necessarily one of cause and effect. The lowered condition of health and the increasing difficulty of performing the daily task which is caused by a progressive tuberculosis is doubtless in itself a direct incentive to an increasing indulgence in alcoholic stimulants and, assuming the tuberculosis to be of such a chronic nature as to enable the excess of alcohol to produce its pathogenic effects upon the tissues, post-mortem examination must needs reveal the association of tuberculosis and alcoholism. The Inspectors of Lunatics in Ireland in the supplement to their Fifty-fourth Report give expression to somewhat the same idea in these words:

"In considering the operation of the various causes of insanity, great allowances must be made for the difficulties which arise in distinguishing the cause from the effect, as, for instance, in cases of alcoholism. Oftentimes the first symptom of mental disturbance is a craving for alcohol, which is given as the cause, whereas it is in reality the effect; in like manner jealousy may be looked on as the cause of mental disturbance in certain forms of insanity, whereas it is merely the outcome of the disease."

But there is probably far more in the relation between alcohol and tuberculosis than mere coincidence, and it has to be remembered that the mere fact of the alcoholic habit is likely to leave a smaller wage margin than would otherwise be the case for purchasing foods which are necessary to maintain the resistance of the body against tuberculosis.

Tatham in his supplement to the 55th Annual Report of the Registrar-General (Part II.) shewed that those occupations which yielded high death-rates from alcoholism and diseases of the liver also furnished high phthisis death-rates. For instance, with a standard of 100 for occupied males, costermongers were found to yield a rate of 239, miners 174, dock labourers 176, and men servants 257.

Dr. Hector Mackenzie, who has devoted much attention to this subject, regards alcohol as a powerful predisposing cause of tuberculosis, and he points out that in patients dying of alcoholic paralysis, tubercle bacilli are in his experience frequently discovered in the lungs. It is found, too, that cirrhosis of the liver is a frequent complication of tuberculosis of the peritoneum and pleura. Mackenzie regards alcohol as rendering the body less resistant to all forms of disease, an opinion which is thought to obtain support from experimental work of Laitinen in Germany.*

An interesting contribution to the pathological side of this question is contained in Vol. III. of the Transactions of the

* Zeitsch. f. Hyg. 1900, vol. xxxvi.

Tuberculosis Congress, 1901, in which Dr. T. N. Kelynack records that pulmonary tuberculosis was met with in as many as 85 per cent. of the cases of alcoholic neuritis which reached the post-mortem table. It is, however, to be borne in mind that conceivably some of this neuritis may have been arsenical. He found, too, on an analysis of 3,053 medical cases examined in the pathological department of the Manchester Royal Infirmary that, after eliminating all doubtful cases of cirrhosis of the liver as well as all secondary cases, over 23 per cent. of the remainder presented evidences of tuberculosis.

In Osler's view chronic drinkers are specially liable both to general acute and to pulmonary tuberculosis. It is probably, he thinks, altogether a question of altered tissue soil, the alcohol lowering the vitality and enabling the bacillus more readily to develop and grow in the body.

As regards the United States of America attention has been paid during the last three years at the Henry Phipps Institute* to the relationship which may obtain between alcoholism and tuberculosis. The following table taken from Third Annual Report of the Institute is instructive :—

New cases.	{	Alcoholism in patient	153	} Out of 655 cases.
		No alcoholism in patients	...	...	483
		No record	...	...	19
		Alcoholism in preceding generation	...	...	166
		No alcoholism in preceding gene- ration.	...	...	451
		No record	...	...	38
Summary for 3 years.	{	No alcoholism in either patient or preceding generation.	375	} Out of 2,999 cases.
		Alcoholism in patient	...	...	628
	{	Alcoholism in preceding generation	579	

The observers interpret these statistics as indicating that all extreme views as regards alcoholism and tuberculosis will have to be abandoned. They regard the figures as conclusively showing that alcohol neither cures nor prevents tuberculosis, while they think that the vast preponderance of non-alcoholic among the applicants for treatment indicates that alcohol does not strongly predispose to the disease.

Bollinger in Germany was struck with the number of waiters of Munich who became tuberculous, and Romme in France thinks that no persons become tuberculous more frequently than those that are alcoholic.

It is, indeed, from French literature that the most definite statements relative to the association between alcohol and tuberculosis are to be found. Landouzy is the author of the aphorism "L'alcoolisme fait le lit de la Tuberculose," and Hazem has expressed the same idea by "La phthisis se prend sur le zinc." This view that alcohol is, so far at least as the French nation is

* Third Annual Report of the Henry Phipps Institute for the Study, Treatment and Prevention of Tuberculosis,

concerned, one of the most important predisposing causes of tuberculosis was supported by a Tuberculosis Commission* which sat in Paris in 1899, under the presidency of M. Jules Siegfried. During, it appears, the 30 years preceding that date the consumption of absinthe, liqueurs and other spirits increased enormously in France, *i.e.*, in 1873 it was 29,192 hectolitres, and in 1897 it was 311,952. It is, of course, matter of common knowledge that during the interval the increase of population remained quite nominal.

The late Professor Brouardel, who was Vice-President of the Commission above referred to, furnished in his interesting monograph "*La Lutte contre la Tuberculose*," a table compiled apparently by Baudran,† of Beauvais, which purported to indicate the relationship of the consumption of alcohol to the prevalence of tuberculosis. In his table, reproduced below, the several Departments of France are arranged in accordance with the consumption of alcohol per head of the population. It is claimed that as the consumption of alcohol per head increases so does the tuberculous death-rate rise, but although this is generally true there are some discrepancies, and it would seem desirable to study the social conditions of the several groups.

Deaths from Tuberculosis per 10,000 living.	Annual consump- tion of litres of alcohol per person.	Deaths from Tuberculosis per 10,000 living.	Annual consump- tion of litres of alcohol per person.
30-40	12.47	70-80	17.16
40-50	15.21	80-90	17.30
50-60	14.72	90 and over.	50.70
60-70	16.36		

At the dispensary in the Rue Haxo Dr. de Lavarenne found 26 alcoholics among 32 tuberculous subjects, *i.e.*, 80 per cent. of the tuberculous were also alcoholic, but it has to be remembered that of persons who resort to dispensaries a considerable number are likely to be tuberculous.

Brouardel added that not only is the phthisical rôle of alcohol undeniable, but that the pulmonary tuberculosis of alcoholic persons is particularly difficult to cure. So relatively incurable are such patients deemed in Germany that alcoholism serves as a reason for the absolute rejection of an applicant for German sanatoria.

Jacquet states that he has found that out of 252 phthisical patients 180, *i.e.*, 71.42 per cent., were alcoholic, while according

* Commission de la Tuberculose. Moyens pratiques de combattre la propagation de la Tuberculose. Masson et Cie., Paris 1900.

† De Lavarenne, De l'alcoolisme et de la Tuberculose (Commission de la Tuberculose, Rapport XVI, p. 278, et Annales d'Hygiène Publique et de Médecine légale 1901, XIV., p. 195).

to Barbier and others, the percentage is as high as 88 per cent. In calculations of this nature the age-grouping of the patients is obviously a matter of importance.

Whatever may be the precise facts as regards the relation between alcoholism and tuberculosis in France, the French have now for many years made anti-alcoholism one of the main points in their crusade against tuberculosis. In England it would seem desirable that a more detailed study of this subject should be made than has hitherto been the case.

OCCUPATION (ESPECIALLY QUÂ DUST) IN RELATION TO CONSUMPTION.

The incidence of phthisis upon persons engaged in certain dust-producing occupations is doubtless a high one. Such incidence is reputed to vary markedly with the nature of the dust; a point of considerable importance. Soft particles produce, it is held, but relatively little effect, whereas the sharp hard particles which are given off during such a process as tin-mining exert an influence as regards phthisis which is disastrous. Between these two extremes there are doubtless many varieties and some anomalies, and it must always be borne in mind that figures relative to occupational diseases require very careful scrutiny and an intimate knowledge of the trade methods and social influences governing each industry, before their real value, quâ dust, can be assessed in each instance. It is necessary, too, to observe that under the term phthisis there are doubtless included the deaths of many persons who have not died from pulmonary tuberculosis.

For certain industries only the young and the strong are selected; for others there is no selection save a natural one, so that under stress of work the weak tend to fall out and the strong remain. Moreover, such of the weak as may contrive to remain in an industry fitted only for the strong probably die and are recorded under the head of that occupation, whereas such of the weak as were from the first feeble, or who become weak in consequence of the work which has been too hard for them, but who as a consequence change their occupation for a lighter but perhaps not less dangerous occupation, are recorded, when they die, under that other occupation and not under the one which they had relinquished, and which was really primarily responsible for their death. But notwithstanding fallacies such as these, and they are numerous, there is a general consensus of opinion that occupations involving the inhalation of hard particles of dust do as matter of fact induce a predisposition to lung disease; and the following table, which is taken from Dr. Tatham's Supplement to the Fifty-fifth Annual Report of the Registrar-General brings out these points with much clearness.

This table, which relates to 1890-92, indicates the mortality figures for phthisis and diseases of the respiratory system combined, and also those for phthisis and for diseases of the respiratory system separately. In an additional column the figures for phthisis and respiratory diseases together are compared, the mortality among agriculturists being taken as 100 and that among the other occupations being shown proportionately to this standard.

Occupation.	Phthisis and Diseases of the Respiratory System.		Phthisis alone.	Diseases of Respiratory System.
	Mortality Figures.	Ratio.	Mortality Figures.	
Agriculturist	221	100	106	115
Ironstone Miner	294	133	90	204
Carpenter	326	148	172	154
Coal Miner	366	166	97	269
Corn Miller	366	166	143	223
Baker, Confectioner	392	177	185	207
Blacksmith	392	177	159	233
Locksmith	428	194	223	205
Wool Manufacturer	447	202	191	256
Tin Worker	451	204	217	234
Carpet Bag Manufacturer	471	213	226	245
Bricklayer, Mason, Builder	476	215	225	251
Rope Maker	486	220	219	267
Cooper, Wood-turner	526	238	250	276
Cotton Manufacturer	540	244	202	238
Lead Worker	545	247	148	297
Chimney Sweep	551	249	260	291
Brass Worker	552	250	279	273
Stone Quarrier	576	261	269	307
Zinc Worker	587	266	240	347
Iron and Steel Manufacturer.	645	292	195	450
Gunsmith	649	294	324	325
Copper Miner	678	307	331	347
Copper Worker	700	317	294	406
Lead Miner	705	319	380	325
Glass Manufacturer	740	335	295	445
File Maker	825	373	402	423
Tin Miner	885	400	308	377
Outler, Scissors Maker	900	407	382	518
Potter, Earthenware Manufacturer.	1,001	453	333	668

It is a somewhat remarkable fact that the incidence of phthisis upon coal miners is a comparatively low one and it has been suggested that there is in coal dust something antagonistic to the development of this tubercle bacillus. Dr. William Ogle, in his Supplement to the Forty-fifth Annual Report of the Registrar-General, considered that, in estimating

the significance of the incidence of phthisis upon coal miners, the appallingly high mortality from accident must be taken into account. As he expressed it: "A man who is killed by an accident cannot also die of phthisis or other diseases."

In connection with this relative immunity from phthisis of coal miners it may be observed that the incidence of alcoholism is also small upon them, although as Ogle pointed out "many of them indulge periodically in excess." The fact that alcoholism is probably one of the predisposing causes of consumption suggests that possibly the immunity of coal miners from phthisis may have some relation to their immunity from alcoholism.

It is not altogether clear as to the manner in which dust is able to induce a high rate of tuberculosis, but seeing that the incidence of this disease is smaller upon persons engaged in occupations associated with soft dust than upon persons working in hard dust occupations, it may be that dust acts by wounding or disorganising the lung tissue in such a manner as to afford the tubercle bacillus not only an easy entry but a nidus.

It would seem, indeed, that the behaviour of phthisis towards dust-producing occupations lends support to a thesis less of dust-borne infection, than of predisposition to infection by some induced alteration of lung substance.

This view has received considerable support from a report* based upon an inquiry into the health of Cornish miners, which was undertaken at the instigation of the Home Office, by Dr. Haldane, F.R.S., Mr. J. S. Martin, and Mr. Arthur Thomas as recently as 1904. *Inter alia*, the investigators pointed out that tables furnished in their report, as regards incidence of lung diseases upon certain groups of persons, indicated that—

1. The excessive mortality among miners in Cornwall as compared with that among occupied males generally, and particularly among coal and ironstone miners, is due entirely to lung diseases (not necessarily phthisis only). Apart from this tendency to lung diseases generally, Cornish mining is, on the whole, an exceptionally healthy and fairly safe occupation; that as regards men up to the age of 45, the mortality of the industry shows marked improvement during the last 50 years, in accordance with the improvement among the population generally.

2. That excessive mortality from lung diseases had, up to 1892, only seriously affected men of over 40. During the last five years, however, there has been an enormous increase in the death-rate from lung diseases, particularly among the younger men from about 25 to 45, with the result that the total death-rate at all ages from 25 to 55 is now greater than at any previous period

* Report to the Secretary of State for the Home Department on the health of Cornish miners, by J. S. Haldane, M.D., F.R.S., Fellow of New College, Oxford, Joseph S. Martin, H.M. Inspector of Mines, and R. Arthur Thomas, Director of Dolcoath Mines. Eyre & Spottiswoode, London, 1904. Price, 1s. 2d.

during the last 50 years. Between the ages of 25 and 45 the death-rate from lung diseases among miners living in Cornwall has recently been from eight to ten times the corresponding death-rate among coal miners or ironstone miners.

It has to be observed that the Cornish mines are all metalliferous; but by far the most important mineral now extracted is tin, and under "tin miners" are included a large number of men (probably about a third of the whole) partly or wholly employed above ground.

The investigators found also that there were no impurities in the air of the Cornish mines, or of the compressed air used in driving the drilling machines, of a sort to account for the remarkable mortality from lung diseases which is recorded.

It was, moreover, ascertained that the mortality amongst such of the miners as worked the machine-drills, and who were thus exposed to the inhalation of a large amount of extremely brittle dust, was enormously in excess of that amongst the miners who were otherwise engaged, a fact which indicates that it was in all probability the dust alone which was responsible for this excessive mortality from lung diseases.

Further analysis showed that with Cornish miners *the death-rate among machine men from respiratory diseases was about 30 times, and the total death-rate about 10 times, as great as that among colliers or ironstone miners of the same age.* On the other hand it appeared that the proportion of deaths from lung diseases generally among Cornish miners who had not worked rock-drills was about three times the normal, and the total death-rate about 1·8 times the normal, at corresponding ages.

As regards the precise type of lung disease from which the Cornish miners died in such large proportion, the Home Office investigators state that "nearly the whole of the deaths of rock-drill men were due to phthisis," and that of the cases examined at least 74 per cent. were tubercular. They add that the predisposing cause of the present excessive mortality among metalliferous miners (of whom the great majority are tin miners) from lung disease is evidently the inhalation of stone dust. The investigators point out that the changes found in the lungs of persons working in coal or in ironstone exhibit very different characters to those observed in the lungs of men suffering from the effects of inhaling stone dust, as for instance in tin mines. The coal dust and ironstone dust appeared to prove relatively innocuous, whereas the dust from hard stone induces the wasting disease so well known among tin miners, lead miners, gold miners, ganister miners, and stone miners in certain districts. In the words of the Home Office investigators—

"So far as Cornish miners are concerned it seems evident enough that the stone dust which they inhale produces permanent injury of the lungs—gradually in the case of ordinary miners and rapidly in the case of machine-drill men—and that this injury

while it is apparently capable of gradually producing by itself great impairment of the respiratory functions, and indirectly of the general health, also predisposes enormously to tuberculosis of the lungs, so that a large proportion of miners die from tubercular phthisis."

This view has been largely substantiated by the report of the Commission on Miner's Phthisis in the Transvaal, which shows that there also the disease is practically confined to rock-drill men. The Transvaal Commissioners and the Transvaal Medical Society have not, however, so frequently found tubercle bacilli in the sputum as has been the case with Dr. Haldane and his colleagues.

A somewhat similar condition of affairs has been observed amongst those engaged in the ganister industry, in which a hard siliceous stone is dealt with; and amongst the Sheffield grinders; but it is uncertain as to the precise amount of this which is tuberculous phthisis.

OVERCROWDING IN ITS INFLUENCE ON PULMONARY TUBERCULOSIS.

The intimate association of phthisis and overcrowding has been recognised for many years, and there are numerous illustrations of such association.

In certain aspects overcrowding may be regarded as one of the expressions of poverty, but although overcrowding is almost always associated with poverty it does not follow that poverty is always associated with overcrowding. With regard to association of phthisis and overcrowding it will be well to keep in mind the fact that persons already tuberculous naturally tend to drift to overcrowded districts. But there are indications that this is not by any means the whole explanation of the observed association of the two conditions.

It was shown by Carnelley, Haldane, and Anderson that in Dundee in houses with four rooms and upwards the death-rate from phthisis was 32 per 10,000, as compared with a death-rate of 55.2 in houses with three rooms, 64.1 in houses with two rooms, and 74.4 in houses of one room.

Barry and Gordon Smith in their investigation as to the effect of back-to-back houses showed a similar state of affairs, as also did the Report of the Army Sanitary Commission, which was issued as far back as 1858.

The latter report indicated that a remarkable incidence of pulmonary tuberculosis upon soldiers was due to the overcrowding and bad ventilation of the barracks of the day.

Similarly, as regards the Navy, the incidence of pulmonary tuberculosis was 26 per 10,000, the incidence of the disease differing very materially in different ships. In Bryson's view

the difference as regards the several ships was due in the main to overcrowding. The conclusion that high mortality from pulmonary tuberculosis both in the Army and Navy was largely the result of overcrowding obtains confirmation from the fact that side by side with the provision of a greater amount of cubic space allowed to each person and with better ventilation there has been a very marked decrease in the incidence of phthisis in both branches of the service.

The oft-quoted experience of the Foot Guards with reference to phthisis is instructive in this connection. From 1837-1846 the death-rate from this disease amounted to no less than 119 per 10,000 of strength, while for the period 1864-70 it had fallen to 23 per 10,000. At the present day the mortality from phthisis in the Army is slightly below that of the male civil population at the same age.*

Side by side with the improved sanitary condition of the soldier's life there may too have been a more careful medical selection of recruits, and possibly more careful designation of disease, but it will not probably be contended that such improved selection, even if it obtained, would suffice to explain the remarkable improvement referred to.

Sir Shirley Murphy has for many years past furnished in his annual reports, relative to the administrative county of London, interesting tables and charts illustrative of association of phthisis and overcrowding, and as these have reference to a population approaching 5,000,000 they have a special interest.

It will be seen from Sir Shirley Murphy's table here reproduced, which shows for a series of districts grouped in accordance with degree of overcrowding, that the death-rate per 1000 living for each of the years 1894-1898 inclusive was very constant in that period.

Proportion of total population living more than two in a room (in tenements of less than five rooms).	Death-rate per 1000 living				
	1894.	1895.	1896.	1897.	1898.
Districts with under 10 per cent. ...	1.07	1.18	1.07	1.14	1.10
" " 10 to 15 " " ...	1.38	1.49	1.46	1.42	1.43
" " 15 to 20 " " ...	1.57	1.64	1.61	1.63	1.61
" " 20 to 25 " " ...	1.81	1.83	1.67	1.75	1.80
" " 25 to 30 " " ...	2.11	2.09	2.06	2.10	2.07
" " 30 to 35 " " ...	2.26	2.42	2.13	2.32	2.42
" " over 35 " " ...	2.46	2.66	2.55	2.64	2.65

Figures furnished in several subsequent reports of the Medical Officer of the London County Council tell much the same story,

* Hamer's Manual of Hygiene.

as will be seen by the following table taken from the 1905 report, and which shows the mortality from phthisis in groups of London sanitary districts arranged in respect to the proportion of their population living more than two in a room in tenements of less than five rooms.

LONDON, 1901-5.

Phthisis death-rates in relation to "overcrowding" (1901 census).

Percentage of over-crowding in each group of sanitary areas.	1901-5 crude phthisis death-rate per 1000 persons living.	Standard death-rate.	Fraction for age and sex correction.	Corrected death-rate per 1000 persons living.	Corrected death-rate (London 1000).
Under 7.5 per cent. ...	1.109	1.718	1.00991	1.120	717
7.5 to 12.5 " " ...	1.376	1.705	1.01761	1.400	896
12.5 to 20.0 " " ...	1.495	1.771	.97969	1.465	937
20.0 to 27.5 " " ...	2.075	1.805	.96124	1.995	1276
Over 27.5 " " ...	2.068	1.651	1.05090	2.175	1390
London	1.563	1.735	1.00000	1.563	1000

In his annual report for 1898 Sir Shirley Murphy considered the interesting question whether overcrowding is associated in a similar manner with other diseases as well as with phthisis, and whether, if such association was found to be the case, it was especially manifest at the same age periods as with phthisis.

He found by a study of the curves constructed from the data available that in the case of phthisis, relation of the disease to overcrowding was especially well marked, and that association in similar sense, although in a minor degree, was manifest in the curve relating to the death-rate from "all causes." It appeared, however, that in the case of tubercular meningitis association in this sense, was much less constant, a deviation which was even more marked in the case of tabes mesenterica. It is especially interesting to note that as regards diarrhoea and the principal zymotic diseases association of this malady with overcrowding was not particularly apparent, and there was no indication of any such association in the case of cancer. There is, therefore, suggestion, Sir Shirley Murphy observes, that "it will be found that while associated with overcrowding is a tendency of the population to die from disease generally this tendency is especially manifested in the case of phthisis and is not manifested in every disease." But he thinks that probably this difference in behaviour will be found to depend upon differences in causation and age distribution of particular diseases.

EFFECTS OF BREATHING FOUL AIR.

On Mortality from Pulmonary Tuberculosis.—Dr. Tatham in his Supplement already referred to, furnishes the appended table, which relates to the period 1890–92. It deals with certain selected industries wherein dust is not a prominent feature, but where the employés are likely to breathe respiratory and other organic impurities, and in some of which the cramped posture adopted by the workmen in their occupation is a common factor.

For each of these occupations the figures indicating the mortality from phthisis and from the diseases of the respiratory system are separately shown, and in the third column the figures representing the mortality from phthisis and respiratory diseases together are compared with the figures for agriculturists, the latter being taken as 100. The occupations are arranged in ascending order of their mortalities from phthisis and respiratory diseases combined.

	Phthisis and Diseases of Respiratory System.		Phthisis.	Diseases of Respiratory System.
	Mortality Figure.	Ratio.	Mortality Figure.	
Agriculturist	221	100	106	115
Engraver, Artist	279	126	146	133
Shopkeeper (Class)	350	158	172	178
Commercial Clerk	390	176	218	172
Butcher	404	183	195	209
Sadler	417	189	248	169
Watchmaker	427	193	234	193
Shoemaker	437	198	256	181
Draper	441	200	260	181
Tobacconist	461	209	280	181
Tailor	466	211	271	195
Hairdresser	489	221	276	213
Hatter	511	231	301	210
Musician	522	236	322	200
Printer	540	244	326	214
Bookbinder	543	246	325	218

The table suggests that that in so far as phthisis mortality is concerned the trades of shoemaker, draper, tobacconist, tailor, hairdresser, hatter, musician, printer and bookbinder are especially deleterious. With respect to certain of these occupations as, for instance, printers and tailors, the death-rate was lower in 1891 than was the case in 1881.

Dr. Tatham's well known figures as regards the prevalence of phthisis in back-to-back houses are instructive in reference to the importance of through ventilation. He found that in localities

where all the houses were constructed "back-to-back" the death-rate from phthisis was 5·2 per 1,000, where 56 per cent. of the houses were so constructed the phthisis death-rate was 3·6 per 1,000, and where only 23 per cent. were constructed in this fashion the death-rate was 3·3 per 1,000; where back-to-back houses were absent the death-rate was only 2·8 per 1,000. Except for the absence of through ventilation the back-to-back houses were, in Dr. Tatham's view, in a better general sanitary condition than the other houses in the same neighbourhood.

SOIL DAMPNESS AS A CAUSE OF TUBERCULOSIS.

That predisposition towards pulmonary tuberculosis is induced by dampness of soil has been strongly indicated by a remarkable series of investigations carried out quite independently in 1866 and 1867 by Dr. Buchanan* in this country, and by Dr. Bowditch† from 1855 to 1862 in America.

The investigation carried out by Buchanan in 1866 was directed to ascertaining the results which had been attained in various parts of England by works and procedures designed to promote the public health. It related to 25 towns containing an aggregate population of 606,186 persons, and ranging in size from populations of from 3,400 to (in a single instance) 160,000. The inquiry involved consideration of some 300,000 deaths, and a comparison was made between the periods preceding, during, carrying out, and subsequent to the extension of sanitary works.

In so far as phthisis was concerned, it was found that remarkable diminution had in numerous places ensued, and that the factor which had apparently above all others influenced reduction of mortality from this disease was the drying of the subsoil by drainage works; as indicated by the level of the subsoil water in shallow wells, by the drying up of springs, and by the statements of the local surveyors.

Thus it was found that those towns wherein there had been much drying of the subsoil as the result of the drainage operations that the death-rate from phthisis had decreased enormously. For instance, in Salisbury and Ely the death-rates from this cause had diminished by 49 and 47 per cent. respectively, while in other towns where drying had also taken place there had been a smaller but generally a notable fall. In places where no fall had taken place, the sewerage operations had resulted in little or no drying or there had been some other factors which had interfered.

* Ninth and Tenth Reports of the Medical Officer of the Privy Council, 1866 and 1867.

† Topographical Distribution and Local Origin of Consumption in Massachusetts. Read at the Annual Meeting of the Massachusetts Medical Society, May 28th, 1862, by Henry I. Bowditch, M.D., of Boston. See also Public Hygiene in America by Henry I. Bowditch, M.D., Boston, 1877.

The following general conclusions were indicated by the inquiry :—

(1) Within the counties of Surrey, Kent and Sussex there is, broadly speaking, less phthisis among populations living on pervious soils than among populations living on impervious soils.

(2) Within the same counties, there is less phthisis among populations living on low-lying pervious soils.

(3) Within the same counties there is less phthisis among populations living on sloping impervious soils than among populations living on flat impervious soils.

(4) The connection between soil and phthisis has been established in this inquiry.

(a) by the existence of general agreement in phthisis mortality between districts that have common geological and topographical features, of a nature that affect the water-holding quality of the soil ;

(b) by the existence of general disagreement between districts that are differently circumstanced in regard to such features ; and

(c) by the discovery of pretty regular circumstances in the fluctuation of the two conditions, from much phthisis with much wetness of soil to little phthisis with little wetness of soil. But the connection between wet soil and phthisis came out last year in another way which must here be recalled.

(d) by the observation that phthisis had been greatly reduced in towns where the water of the soil had been artificially removed, and that it had not been reduced in other towns where the soil had not been dried.

(5) The whole of the foregoing conclusions combine into one— which may be affirmed generally and not only of particular districts— *that wetness of soil is a cause of phthisis to the population living upon it.*

(6) No other circumstance can be detected after careful consideration of the materials accumulated during this year that coincides on any large scale with the greater or less prevalence of phthisis, except the one condition of soil.

(7) In this year's inquiry, and in last year's also, single apparent exceptions to the general law have been detected. They are probably not altogether errors of fact or observation, but are indications of some other law in the background that we are not able to announce.

Dampness of soil,* whatever may be the character of the relation, has therefore to be regarded as *one* of the predisposing causes of phthisis, but it has to be remembered that there are many others, and the precise value of each factor must depend largely upon the importance which science eventually attaches to bovine tuberculosis and to case-to-case infection.

THE RELATION OF INSANITY TO PULMONARY TUBERCULOSIS.

The excessive incidence of pulmonary tuberculosis upon patients confined in institutions for the mentally unsound has been a matter for serious consideration amongst alienists in

* Dr. Arthur Ransome, F.R.S., in conjunction with Professor Dreschfeld, has shown in his *Researches on Tuberculosis* that sputum retained its virulence for months in an undrained cottage and lost it in a few days when exposed over sandy soil.

England, Europe and America for several years past. The correct interpretation of this admittedly high incidence has given rise to much discussion. By some it has been regarded as evidence of increased opportunities for infection; by others, notably Mott, it has been viewed as evidence not so much of infection as of enhanced tissue proclivity. A considerable amount of evidence upon this subject as regards this country has been collected by Dr. T. G. Clouston, Dr. F. G. Crookshank, and Dr. Eric France, as also by a Committee of the Medico-Psychological Association. In France the Commission on Tuberculosis in 1900, which sat under the Presidency of the late Professor Brouardel, went in considerable detail into the subject, as also about the same time did the official statistics of Prussia. All those sources of information agree as to the enormous prevalence of tuberculosis amongst the insane.

It has been suggested by Mr. A. F. Thredgold, in his work on Dementia, that there may be some hereditary proclivity towards tuberculosis amongst the insane and weak-minded, and he has furnished some figures which would seem to indicate that in families in which weak-minded children are born there is in 34 per cent. a marked tendency to pulmonary or other form of tuberculosis, and in this connection a study of the alleged increase both of insanity and of tuberculosis in the members of the Celtic race might prove useful. Dr. Brain reported in 1900 that of 74 consecutive cases of phthisis between the ages of 20 and 62 years which were under treatment in the Lancashire asylums, there were only three who had acquired phthisis before admission to the asylum.*

On the other hand some recent work carried out by Dr. Frederick W. Mott, F.R.S., Pathologist to the London County Council, who has made a careful study of this question in the London asylums, inclines to the view as the result of a very extensive post-mortem experience at the Colney Hatch Asylum that tubercle, in the majority of cases, was not acquired in this asylum. In his view—

1. It may be obsolescent, as evidence by old scars at one or both apices, often with calcareous deposits and tubercle elsewhere, or there may be old caseous and calcareous bronchial or mesenteric glands without any evidence of active disease.

2. There may be obsolescent tubercle in one place and active tubercle in another, *e.g.*, in a post-mortem on an imbecile youth there was acute tubercular pleurisy, but I found this was due to infection through the diaphragm by a broken down mesenteric gland which had formed an abscess. Other mesenteric glands were caseous and some throughout calcareous. There could be no doubt that the youth, who had been in the asylum under two years, had not acquired these old tuberculous glands during that time. Probably the infection occurred in early childhood.

3. A large number of people die who have been resident in the asylum a great number of years without any sign of recent or old tuberculosis.

* Medico-Psychological Association's Tuberculosis Report.

4. A certain number of cases occur in which it is extremely difficult to fix the exact date of the onset of the disease. The fact that the tubercle was not diagnosed on admission to the asylum is not of much value, for the detection of early or old and obsolescent tuberculosis in the insane is very difficult. Moreover, experience shows that a considerable number of cases of extensive tuberculosis have not been reported at all, and the disease has been discovered post-mortem.

5. Again a certain number of cases are diagnosed as tubercle during life which show no evidence of tuberculosis post-mortem.

Dr. Mott's experiences at Claybury Asylum supported his Colney Hatch experiences, *i.e.*, that the majority of the cases presented evidence pointing to the existence of disease before admission; and it is worthy of note that in this asylum during 1903-1904 over 30 per cent. of the inmates were suffering from tuberculosis.

Further experience has confirmed Dr. Mott's preliminary conclusions, and in his Annual Report to the London County Council for the year ending March 31st, 1907, he observes:—

As noted in the reports of previous years, the number of cases in which the disease may have been acquired during the patients' residence in the asylum is very small. Of the 45 cases (26 males, 19 females) with active tuberculous lesions post-mortem in only six (three males, three females) was it probable that the disease had been acquired in the asylum; in the remainder the disease was either active on admission or the presence of calcareous glands or scars at the post-mortem examination showed that the active lesions were but a recurrence of the disease.

Dr. Mott also states in the same report that the form of insanity in which tuberculosis bulks most largely is melancholia, in many of which cases phthisis is diagnosed on admission. Cases of insanity associated with a general nutritional deficiency are, he adds, in far greater numbers than cases of mania with tuberculosis, and generally in the latter class the mania tends to melancholia and even stupor as the lung disease advances. In the majority of the cases of pulmonary tuberculosis which are associated with what is termed "chronic insanity," and in which the phthisis is diagnosed some time after the onset of the mental symptoms, the autopsies reveal signs of old tubercle. Dr. Mott thinks that in these cases the obsolescent tubercle again becomes active with the gradual lowering of the patient's physical condition.

Obsolescent tuberculosis is, Dr. Mott finds, present in all types of insanity, and during the year 27.1 per cent. of the male and 22 per cent. of the female post-mortems at Claybury Asylum showed evidence of obsolescent, without active, tuberculosis.

In the Prussian asylums, where a post-mortem examination is made in some 70 per cent. of the patients dying therein, there were, during 1901, 70,958 lunatics treated in the several asylums. Of the 5,128 deaths which occurred, 820 died from tuberculosis, and of the total deaths, 36.3 per cent. were from lung diseases, of which 16 per cent. were due to pulmonary tuberculosis.

It was mainly amongst the idiots that the greatest death-rate was noticed, as out of 462 deaths among the idiots more than half died from lung disease, and of these three-fifths were due to tuberculosis. One half the idiots treated were under 30 years of age.

The French asylums yield evidence of much the same nature. During 1894-1898 the death-rate from tuberculosis in these institutions was 117 per 10,000 as compared with an annual mortality from this disease of 45·8 per 10,000 for the whole of France.

Arranging the French asylums in groups in the order of their death-rates from tuberculosis, it was found that the rates ranged from 48·7 per 10,000 to 196·7 per 10,000, figures which suggest that further investigation might perhaps give fuller light upon the causation of the disease.

The special proclivity has been noticed also in America, where in the Manhattan State Asylum a system of tent life for the tuberculosis insane has been introduced by Dr. A. E. Macdonald with very encouraging results.

Fortunately, whatever be the explanation of this admittedly heavy incidence of tuberculosis in asylums for the insane, the treatment is identical, *i.e.*, the adoption of better ventilation, a more varied diet, more cubic space, and more life spent in the open air. It is possible, as has been suggested to me by the medical officer of an asylum for idiots, that there has in the past been over-anxiety to maintain the wards at too high a temperature, and thus to prevent the adequate supply of fresh air.

THE DIMINUTION OF ZYMOTIC DISEASE AS INFLUENCING THE DECLINE IN THE DEATH-RATE FROM PULMONARY TUBERCULOSIS.

It is a fact of common knowledge that attacks of pulmonary tuberculosis not infrequently follow attacks of debilitating diseases, such as one or another of the zymotic diseases, and if, as seems extremely probable, these latter diseases predispose to phthisis, a reduction in their prevalence should influence favourably the death-rate from pulmonary tuberculosis. Dr. Niven draws attention to this point in his last (1906) Annual Report, and, referring to the report of the Registrar-General for the year 1905, he points out that of a total gain in the death-rate at the end of 30 years of 5,957·8 lives per million no fewer than 2,180 were gained under the group of zymotic diseases comprising small-pox, measles, scarlet, typhus, or enteric fevers, whooping cough, diphtheria, croup, diarrhoea, dysentery, and cholera, and he expresses the opinion, with which many epidemiologists will agree, that probably the saving of life under the head of "zymotic" diseases means an immense reduction in the number of lesions which predispose to phthisis in persons who have survived attacks of such diseases.

Summary of Chapter.

From considerations set forth in this and former chapters, it would seem clear that excessive prevalence of pulmonary tuberculosis is found associated, often presumably in relation of cause and effect, with the following conditions: Poverty with its attendant conditions, underfeeding, overcrowding, deficiency of light, of ventilation, and of cleanliness; occupations involving the inhalation of sharp dust particles; dampness of soil; and alcoholism, as well as an undue incidence of such diseases as measles and lung diseases which predisposes the patients to new infection or to the maturing of an old latent tuberculosis. From the point of view of prevention, as well as largely in respect of the treatment of the already tubercular, efforts to reduce so far as practicable these predisposing causes afford, together with measures aiming at the avoidance of direct infection, the surest prospects of effecting a material reduction in the death-rate from the disease.

As Sir Shirley Murphy has concisely stated in his annual report for 1904 :—

Whatever view may be taken of the possibility of reducing phthisis prevalence by the segregation of persons whose expectoration is charged with tubercle bacilli, no doubt is entertained of the greater susceptibility of some persons than others to attack of phthisis, and while racial susceptibility and family susceptibility are recognised, the greater liability to attack by the badly housed and especially the badly fed is a factor which must be reckoned with in any attempt to reduce the mortality from this disease. Hence the need not only for attention to be directed to the care of the patient, but for the well-being of the family to be ensured, so far as that may be found possible, and for the organisation of philanthropic effort in such a way that it may be brought into relation with the work of the medical officer of health and made available in suitable cases. Phthisis in large degree is a disease of poverty, and in so far as the social condition of the people is improved, the risk of attack by phthisis is lessened for all.

Dr. Niven in his Annual Report of 1906, after an analysis of the principal causes which are likely to have promoted the remarkable decline in pulmonary tuberculosis in England and Wales, regards as the chief factors the great advance in the material well-being of the working classes extending over the whole country and producing increased resistance to the disease. This advance, in his opinion, has entailed cheaper, more varied, and more abundant food and clothing, better conditions of housing, greater cleanliness, and a larger proportion of the population enjoying these advantages; and he expresses the opinion that the direction in which we may hope to reduce tuberculosis most effectually are :—

- (1) The improvements in physique of the population, especially of those persons specially exposed to tubercular infection, and by the diminution of those diseases and conditions which predispose to phthisis;
- (2) By the removal of dirt from the neighbourhood and from the interior of habitations; and
- (3) By the removal of the specific infecting matters of tuberculosis.

CHAPTER V.

**THE PREVALENCE OF TUBERCULOSIS IN THE HUMAN
SUBJECT AND THE EVIDENCE WHICH SUCH PREVALENCE
AFFORDS OF THE CURABILITY OF THE DISEASE.**

In order to obtain as clear a view as practicable as to the value and share of sanatoria in aiding the promotion of the cure or arrest of tuberculosis it is desirable to consider the evidence as to the manner in which the disease has behaved in the past either when left alone or when treated by other methods than residence in sanatoria.

If a large proportion of the general population is found after death to have at one time or another suffered from tuberculosis, the fact must be regarded as supporting a view that the natural tendency of the disease is towards recovery or cure ; and inference in this sense becomes the stronger if it be ascertained that during life the tuberculous condition referred to remained undiagnosed and, hence, untreated.

Although a belief in this tendency towards cure of tuberculosis was to some extent prevalent as far back as Hippocrates, who wrote "phthisis if treated early enough gets well," the fact of such tendency only became definitely recognised during the last century. Even now, it is perhaps less fully appreciated than could be wished. In the earlier half of the last century, in 1838, Carswell wrote "Pathological anatomy has never, perhaps, given "a more decided proof of the cure of a disease than it gives in "case of pulmonary tuberculosis."

Professor Clifford Allbutt* referring in 1901 to the prevalent opinion prior to Brehmer, stated : "We did not realise the facts "which the computations of Birch-Hirschfeld and others have "placed beyond question, that then, as now, many persons were "recovering from pulmonary phthisis under our eyes ; our eyes "were not open to see it."

As regards foreign observers, Guillot, in 1860, stated that he had discovered signs of cured tuberculosis in 60 per cent. of necropsies made by him upon old people, while Letulle of Paris has shown more recently that out of 189 autopsies made by him only 72 were found to be quite free from signs and suspicions of tuberculosis. Ribard recorded that 50 per cent. of men thought to be well and who died from old age or from accident had at one time or another during their lives suffered from tuberculosis, and he adds : "There are then many attacks and "also many recoveries when a half of the human race has

* Opening address on sanatorium treatment, by T. Clifford Allbutt, M.D., LL.D., D.Sc., F.R.S., &c. Transactions of the British Congress on Tuberculosis. 1901. Vol. III.

"tubercles but supports them without knowing it. Such is the "significance truly comforting of the result of the autopsies."

Brouardel in his "*La Lutte contre la Tuberculose*," when recording his experiences at the Morgue in Paris, states that in necropsies made on the bodies of persons who had lived 12 years in Paris he found that in 50 per cent. of such cases there were signs of old tuberculous lesions cured either by calcification or by fibrosis.

Lubarsh in a report on the Pathological Department of the Royal Hygienic Institute in Posen, tells us that of 800 bodies which were dissected 61 per cent. showed tuberculous lesions; and that, if the observations were confined to those over 16 years of age, 88.4 per cent. were found to be tuberculous.

Nägeli of Zurich claims to have detected lesions such as those referred to in no less than 90 per cent. of 500 autopsies performed by him; indeed, he alleges that in autopsies of men over 30 years of age he had found none absolutely free from signs of tuberculous infection. From 18-30 years of age, 96 per cent. were found infected, from 14-18 years, 50 per cent., from 5-14, 55 per cent. From 1-5 years 17 per cent. were affected with tuberculosis of the brain, but on the other hand, the bodies of children under one year of age showed no sign of tuberculous brain disease.

Von Behring in the paper referred to above, calls attention to the remarkable statistics of Francy, who tested with tuberculin the men of the Bosnian-Herzegovinian infantry regiment No. 1, and of the infantry regiment No. 60 which is recruited from Hungary. Small doses (1-3 mgs.) only were used, but the results appeared to show that of the men in the first year of service 61 per cent., and of those in the second year 68 per cent. were infected with tuberculosis. Von Behring finds confirmation of the results obtained by Nägeli in the fact that out of 96 quite young children tested by him with tuberculin none reacted in typical fashion. Exception will no doubt be taken to conclusions which are based upon the tuberculin test; nevertheless the facts cannot be well ignored, and there would appear to be at least some basis for the German saying that *Jedermann hat am Ende ein bischen Tuberculose*.

With regard to long-standing tubercle frequently revealed on the post-mortem table, it is well to bear in mind that many of these old lesions tell the story not merely of early arrested phthisis. "These lesions," as Professor Brouardel told us in his introductory address at the British Tuberculosis Congress in 1901,* "in the majority of cases are not phthisis in an "early stage manifested by small disseminated foci; they are "cicatrices of large foci, sometimes of wide completely cicatrised "cavities. Phthisis, therefore, is curable even in its most advanced

* Transactions of the British Tuberculosis Congress on Tuberculosis, Vol. I. William Clowes & Sons, Limited, London, 1902.

"stages," and Grancher has expressed the opinion that "Tuberculosis is the most easily cured of chronic diseases."

Osler dealing with this subject observes, presumably on a basis of work in America: "My experience tallies closely with the larger analysis made by Heitler of the Vienna post-mortem records, in which of 16,562 cases in which the death was not directly caused by phthisis there were 780 instances of obsolete tubercle—a percentage of 4·7. He excluded, as I have done, the simple fibroid indurations. Various observations have been made of late in which the percentage ranges from 27 (Bollinger) to 39 (Massini). In 200 autopsies in which this point was specially examined, Harris found 38·8 per cent. in which there were relics of former active tuberculosis. The statement is made by Bouchard that of the post-mortems at the Paris morgue—generally upon persons dying suddenly—the percentage found with some evidence of tuberculous lesion, active or obsolete, is as high as 75. Large as these figures appear, they are not probably incorrect. If, as has been done in Ribbert's laboratory, a systematic inspection is made for the purpose, tuberculous lesions are found in practically 100 per cent. of the bodies of adults!"*

With reference to English records Dr. Ransome, F.R.S., stated in the Milroy Lectures for 1890 that his colleague, Dr. Harris, had found in the Manchester Royal Infirmary that there was evidence of much phthisis in at least 39 per cent. of the autopsies.

As regards latent tuberculosis in children, some striking evidence, in so far as French children are concerned, was contributed by Professor Ganghofner to the International Tuberculosis Congress held in Paris in October, 1905.† He stated that in the course of 1,800 autopsies on bodies of children dead of diseases other than tuberculosis, and who during life had presented no clinical symptoms of tuberculosis, he had found signs of tuberculosis present in the following proportion:—

Among 460 deaths of children under 1	...	33 = 7·1 per cent.
" 536 " " " aged 1-2	...	86 = 16·0 " "
" 476 " " " " 2-7	...	117 = 24·5 " "
" 271 " " " " 4-6	...	73 = 26·9 " "
" 123 " " " " 6-8	...	33 = 26·8 " "

The figures referred to by this observer are no doubt open to criticism on the ground that they relate almost exclusively to the poorer classes, i.e., to the group of children upon which tuberculosis exerts its heaviest incidence; they relate, too, to hospital and infirmary patients upon whom the incidence of tuberculosis might be expected to be exceptionally heavy. And even if, as is doubtless the case in some instances, the deaths of those dying

* The Principles and Practice of Medicine, by William Osler, M.D., F.R.S., &c., &c. Fifth Edition. London. D. Appleton and Company, 1904.

† *Preservation Scolaire Contre La Tuberculose*, par le Prof. F. Ganghofner de Prague.

from tuberculosis were deducted before the percentages were taken, there still remains the fact that the observations are limited for the most part to those who may be regarded as the relatively "unfit."

In the German periodical "Tuberculosis" for April, 1906 (Vol. 5, No. 4), Dr. H. Bertzke of Berlin, under the title "Über Häufigkeit und Infektionswege der Tuberculöse" discusses the principal laid down by Nägeli, that, judging from the results yielded by pathological observations, "every adult is tuberculous." In Dr. Bertzke's opinion it would be more correct to say that of the adults who have died in hospital some 70 per cent. show evidence of tuberculous changes, and he thinks, as against Nägeli's estimate of 90 per cent., *that only about one half of the total number of adults are infected with tuberculosis.*

Professor Clifford Allbutt presented the same idea concisely when in his address already referred to he said "I am guilty of no extravagance when I suggest that one-third of you who hear me, wittingly or unwittingly are, or have been, infected with tubercle."

Though the statistics referred to and other similar statements be not accepted in their entirety, it will probably be conceded that the evidence indicates that the natural tendency of tuberculosis is towards cure, *i.e.*, that many living persons, have at one time or another in their lives suffered active invasion of their tissues by the tubercle bacillus. For most of them happily improvement in health, brought about either consciously or unconsciously, has resulted in a "cure" or in the local condition becoming inactive; so that many of them have lost count of a former "delicacy" and have for many years been able to pursue their usual avocations.

This natural tendency towards "cure" must very obviously be held in view in any attempt to correctly estimate the value of sanatoria as curative agents. Especially must it be taken account of if comparison is to be made of the relative value of sanatorium treatment and of other curative methods earlier in practice. Clearly, too, it is possible to conceive of one sanatorium which has been fortunate enough to select the majority of its patients from amongst those having a natural tendency towards recovery, and of another unfortunate enough to have received only patients prone to die, and this conception indicates that caution must be observed in drawing inferences from the statistics of sanatoria. The problem indeed of the prevention of phthisis may resolve itself into a question as to what proportion of available money should be expended in attack upon the parasite which is one of the causes of the disease, and what proportion should be directed towards rendering the population relatively immune to this disease by improved conditions of living. This question will receive further consideration in a later chapter.

CHAPTER VI.

THE DURATION OF RECOGNISED PULMONARY TUBERCULOSIS
IN PRE-SANATORIUM TIMES.

It has been shown in the previous chapter that a large number of persons suffer at one or another period of their lives from a tuberculosis which is never recognised ; the disease becoming, as it were, automatically or rather unconsciously arrested ; and it is proposed in this chapter to furnish data pointing to the conclusion that, prior to the existence of sanatoria, a substantial proportion of *recognised* cases which underwent some form of treatment lived for many years.

In order to assess, even approximately, the value of sanatorium treatment as compared with other methods or places of treatment, a proper comprehension of this point is of cardinal importance.

Unfortunately the records of these pre-sanatorium days are not so exact or so full as could be wished, but, nevertheless, valuable data have been collected, and from these it is possible to deduce, with considerable probability, certain general inferences.

The main criticism which the statistician would direct against these data is that they refer for the most part to the poorer classes, and not infrequently to patients who, when they first come under treatment, are already in an advanced stage of the disease. Moreover, such statistics apparently take no note of the numerous cases which, although already suffering from phthisis, do not seek medical advice, and this latter fact shows the great difficulty which must constantly be experienced of fixing accurately the precise onset of the malady. Portal was alive to this difficulty when he wrote :—

“If a cough have existed for six months with severity or, if the individual have been prevented from working for the same period by increasing weakness, the answer will be “six months,” although a year or two previously he may have had hæmoptysis, attacks of sweating or some grave alteration of health indicating the beginning of tubercular affection.

“In estimating the starting point of tubercular disease, we have often to look for and refer the patient back to early symptoms, long forgotten ; to an hæmoptysis in youth, or to an attack of hectic which had taken place years before.”

The remarks of Dr. Samuel West* are also well worth quoting in this connection. Referring to Laennec's statement

* Diseases of the Organs of Respiration, by Samuel West, M.A., M.D., L.R.C.P., London : Charles Griffin & Co., 1902.

that with tubercle in any part of the body, if any other organ become secondarily involved it is almost certain to be the lungs, he observes—

“Phthisis then, is often the result of auto-infection, so that the date of the commencement of phthisis is not necessarily, or as a matter of fact usually, the date of the introduction of tubercle into the body.”

He then refers to the fact that Buhl proved long since that phthisis was associated with the antecedent presence of caseous material in some other part of the body, and he points out that the aphorism “no phthisis without an antecedent caseous (*i.e.*, tubercular) focus” which might be regarded as expressing the teaching of Buhl’s time, is as true now as then. If this be so, as West remarks :—

“The date of the original infection with tubercle is thrust further and further back, even it may be into early childhood, so that, in considering the causation of phthisis it will be necessary to deal with the original sources of infection in early life.”

In the first Brompton report some interesting figures will be found relative to the duration of phthisis in pre-sanatorium days. The table relates to 215 fatal cases, and it appears that in no less than 25·8 per cent. the disease had lasted from two years to over four years, the percentage with a history of over four years being 6·5. On the other hand considerably more than half the entire number of cases were fatal within a period of 18 months. In the second annual report which relates to the period from 1849 to 1862, an instructive table reproduced below is furnished relative to the duration of the illness *before admission* to the hospital, and such table must be regarded as a useful indication as to total duration.

Duration of Illness before Admission.

—	Males.	Females.	Total.
Under 3 months	91	66	157
3- 6 " 	337	229	566
6-12 " 	686	514	1,200
12-18 " 	335	155	490
18-24 " 	327	242	569
Chronic 	472	422	894
Total 	2,248	1,628	3,876

But not only are the statistics as regards the duration of consumption vitiated materially by the fact that there is difficulty in ascertaining the date of onset of the disease, but they must be accepted with caution, owing to the important circumstance that they take no note whatever of the enormous number of cases which are never recognised during life. Moreover, many

of them relate to the in-patients of consumption hospitals who are, by virtue of their being in-patients, already relatively advanced cases.

As to this Portal may be again quoted :—

“It is matter of observation that men will follow out the most pernicious trades while far advanced in consumption to provide for the necessities of their families, and so it is found that we have rarely incipient phthisis in our wards. For a like reason the early form of the affection is most commonly represented in the hospital by females.”

It is clear therefore that no general inferences are derivable from statistics culled merely from the wards of consumption hospitals.

Similarly with regard to general hospitals, as Dr. Percy Kidd observes in his article on phthisis pulmonalis in Clifford Allbutt's *System of Medicine* :—

“Patients admitted into general hospitals are either exceptionally ill or are suffering from some serious complication.”

With respect to out-patients the circumstances are different in that, generally speaking, the patients are in a less advanced phase of the malady. But here again we are dealing with the poorer and least “fit” class. There is, too, the difficulty that statistics drawn from this class of patients relate as a rule to such cases as have had a fatal termination, and they take no account of the cases which have for one or another reason discontinued their attendance.

But if these foregoing considerations be held in view the illustrations now to be given are of material value.

As to the course of what may be termed confirmed phthisis in olden days, Sydenham* wrote :—

“When once the disease is confirmed and has taken root, it despises for the most part all remedies. However, the cure might be attempted by diminishing the cause of the deflexion upon the lungs by bleeding in the arms and by exhibiting gentle purgatives.”

He recommends the sick to :—

“take long and far journeys on horseback”

and in describing the course of the malady, he wrote :—

“And so in the approaching summer the sick at length submits to his fate, and even by the disease to which the preceding winter led the way, meets his death ; and this is the chief kind of consumption.”

Louis and Bayle gave the mean duration as 23 months and Laennec and Andral at two years, but as to these latter observations, Dr. James Clarke in his treatise remarks :—

“It may be well for the reader to bear in mind that these tables are calculated from fatal cases which occurred in hospital treatment.”

* The Signs, Symptoms, Causes and Cures of Disease ; with many additions from the Second Edition of the Latin copy. His Discourses of Consumption, Gout, &c., never before published. Translated into English by William Salmon, Professor of Physic, 1695.

In the second edition of his work* Louis furnishes particulars as to 190 subjects in whom the duration of the disease was fixed so far as practicable.

He states :—

"Three died in one month ; one in less than a month ; eleven in from thirty-five to eighty-four days ; fifty-two, or nearly one-third of the whole, from the seventh to the twelfth month, both included. Forty-one from the thirteenth to the twenty-fourth month, both included ; and the twenty-three remaining patients from the beginning of the third year to the middle of the eighth."

Louis adds that these figures differ but little from the series of 114 cases which he gave in a former edition.

In the first Brompton report, out of 215 fatal cases 40·8 per cent. died in less than one year after attack, 45·3 per cent. between one and four years, and 6·5 per cent. lasted more than four years.

But as Drs. C. J. B. and Theodore Williams point out, the Brompton report relates to cases occurring among in-patients who, for various reasons, were in an advanced stage of the disease on admission.

As to the desirability of considering out-patient as well as in-patient statistics in any endeavours to arrive at a reliable conclusion as regards the duration of life in *recognised* cases, Dr. J. E. Pollock, referring to the out-patient department of the Brompton Hospital, writes :—

"Here (among the out-patients) are seen individuals of all classes, excepting the highest, and of all ages and occupations. The necessities of home cares, and of continuing the daily work are but little interfered with by a visit once a fortnight to their physician ; but these urgent claims of domestic life shut out large numbers from the possibility of availing themselves of indoor treatment in hospital. The large class affected with chronic slow phthisis are, therefore, found chiefly among the out-patients.

"The average duration while under observation of all the classes taken together was two years six months and three-fifths nearly, but this represents only a part of the period of affection, and in it are included cases of the most acute and rapid form as well as those which have become chronic."

In his "Elements of Prognosis in Phthisis," Dr. Pollock gives the average duration of life in 129 cases which ended fatally as $2\frac{1}{2}$ to three years ; these cases occurring among 5,566 hospital out-patients, the remainder of whom were living and in a state of health indicating a considerable expectation of life, at the end of $2\frac{1}{4}$ years.

Commenting upon these cases Dr. Percy Kidd, in his article above referred to, states :—

"The actual duration of the cases must have been considerably longer, and the whole average duration of the disease, as Dr. Pollock says, must be raised beyond four years. An experience of twelve years out-patient work at Brompton Hospital has convinced me that Dr. Pollock is far nearer the mark than those who limit the average to two years."

* Researches on Phthisis ; anatomical, pathological and therapeutical, by P. C. A. Louis, M.D. Translated by Walter Hayle Walsh, M.D. Printed for the New Sydenham Society, MDCCCLIV.

Dettweiler, basing his observations upon the behaviour of the disease in the middle classes of Germany, puts the average duration of life at seven years.*

Leudet, as the result of observations on 488 patients, thought that as regards those in good circumstances an average duration of five years should be allowed, and for hospital patients, three, and M. Andral was led by his experience at La Charité to put the duration in hospital at two years.†

With respect to the duration of life amongst the tuberculous of classes other than the poor, the figures of the Drs. C. J. B. and Theodore Williams are of great value, since they refer to 1,000 cases belonging to the upper and middle classes who first consulted Dr. Williams between 1842 and 1864, *i.e.*, over a period of 23 years, and the cases were those *which had been under treatment twelve months and upwards*.

As regards sex distribution 62·5 per cent. were males, 37·5 females, as compared in Dr. Pollock's cases, with 60·75 per cent. males and 39·25 per cent. females.

The age distribution of the cases selected by the two Williams' was as follows :—

Under 10	...	...	...	1·3	per cent.
10-20	...	...	...	18·2	"
20-30	...	...	...	41·8	"
30-40	...	...	...	24·9	"
40-50	...	...	...	9·4	"
50-60	...	...	...	3·0	"
60 and upwards	...	...	...	1·4	"

The average age of the males was 29·47, and of the females, 26·06.

Of the 1,000 cases 198 were ascertained to have died, and the time lived in the cases were as follows :—

8	lived	1 year and under	2 years.
22	"	2 years	" 3 "
18	"	3 "	" 4 "
23	"	4 "	" 5 "
75	"	5 to 9 years inclusive.	
31	"	10 " 14	" "
12	"	15 " 19	" "
9	"	20 " 30	" "
Total		198	

* Tuberculosis.—Acute General Miliary Tuberculosis, by Prof. Dr. G. Cornet, of Berlin. Nothnagel's Encyclopedia of Practical Medicine, English edition. Edited, with additions by Walter B. James, M.D. Translated from the German under the supervision of Professor Stengel, M.D. M. B. Saunders & Co., 1901.

† A Treatise on Pulmonary Consumption, comprehending an inquiry into the causes, nature, &c, prevention and treatment of Tuberculosis and Scrofulous Diseases in general, by James Clark, M.D., F.R.S., London, 1835.

The average duration of the disease in these 198 patients was 7 years and 7 months, the highest average duration among deaths from phthisis which had at that time been published.

The after histories of the 802 patients who were alive when last heard of by Dr. Williams furnish some very instructive data.

The average duration of life had been 8 years 2·19 months, and the following table shows this fact in more detailed fashion :—

71	have lived	1 year and less than 2 years.		
97	"	2 years	"	3 "
96	"	3 "	"	4 "
68	"	4 "	"	5 "
224	"	from 5 to 10 years.		
124	"	10 to 15 "		
54	"	15 to 20 "		
65	"	20 to 30 "		
3	had lived	30 years and upwards.		

Total 802

and the state of these patients at the date of the last report which dealt with them was :—

" Well "	...	...	285	or	35·5 per cent.
" Tolerably well "	...	...	293	or	36·5 "
" Worse "	...	...	224	or	28·0 "
			802		100·0

But in comparing these results with those recorded by Louis and Laennec it must not be forgotten, as Dr. Williams himself points out, that the restriction adopted by the Williams' of excluding very acute cases by virtue of the fact that every case dealt with by them in their statistics had been under treatment 12 months and upwards, is a precaution which was not taken with reference to the other group of statistics referred to, and, therefore, the figures are not strictly speaking comparable. They represent in a sense selected cases, and as selection is now largely exercised in filling beds at " public " sanatoria, the figures are of very material value.

Hammer of Heidelberg compared the results with regard to 72 patients who were three months in a sanatorium with 53 treated as ordinary out-patients, the " cures " amounting to 35 per cent. in the sanatorium patients and 52·7 per cent. among the out-patients.

According to Knopf,* Charcot in his " *Traité de Médecine de Charcot et Bouchard* " says " Phthisis is susceptible of cure

* Pulmonary Tuberculosis ; its modern prophylaxis, and the treatment in special institutions and at home, by S. A. Knopf, M.D. London : H. K. Lewis, 136, Gower Street, W.O. 1899.

completely and definitely, even at the period of cavities," and Grancher in his "*Leçons cliniques sur les maladies de l'appareil respiratoire*," published in 1880, writes "We affirm the curability of the tubercle; we affirm that, instead of being a miserable neoplasm incapable of organisation, the tubercle tends naturally to fibrous formation," and Bouchard at the conclusion of his lectures in 1888 (*i.e.*, in practically pre-sanatorium times) on the curability of phthisis, sent forth this hopeful message: "This disease, which has such a strong hold on humanity, is curable in the largest number of cases."

The second annual report of the Henry Phipps' Institution (at Philadelphia) for the Study, Treatment and Prevention of Tuberculosis, for which my thanks are due to its Director, Dr. Lawrence F. Flick, contains some interesting data as to the duration of the disease:—

New cases	{	Less than 2 years	434	} 885.
		2 to 5 "	...	...	...	246
		5 " 10 "	...	...	...	87
		10 " 20 "	...	...	...	52
		Over 20 "	...	...	...	11
		No record	...	...	...	55
Summary of 2 years.	{	Less than 2 years	1,072	} 2,344.
		2 to 5 "	...	...	...	725
		5 " 10 "	...	...	...	248
		10 " 20 "	...	...	...	161
		Over 20 "	...	...	...	41
		No record	97	

As to this table, the report states that the more we learn about tuberculosis the more apparent it becomes that the disease is always of long duration. It is added that a comparison of the cases for the second year with the cases for two years elicits the fact that during the second year the examinations showed a longer duration of the malady than in the case of the patients examined during the first year, and such difference is ascribed to greater experience in the art of examining the patients. It was found that the patients tended quite unconsciously to supply information as regards manifestations of the disease in early life. The report expresses the view that in the past medical men have usually measured the duration of the disease by the period of mixed infection, and it is thought that this practice still obtains. "The correct duration of the disease, however, should be measured from the implantation, and this implies a long period of dormancy in most cases. The probabilities are that tuberculosis is always primarily a lymphatic disease, and that the lymphatic period is always dormant, except when the disease manifests itself by an enlarged superficial gland."

In his annual report for the County Borough of Blackburn for 1906, Dr. Alfred Greenwood furnishes some suggestive figures, and further investigations on somewhat similar lines might be helpful.

Eighty deaths from phthisis were investigated, and so far as could be ascertained duration of the disease had been as follows :—

In 9 cases	...	...	1 to 3 months.
" 22 "	...	...	3 " 6 "
" 23 "	...	...	6 " 12 "
" 8 "	...	...	1 " 2 years.
" 5 "	...	...	2 " 3 "
" 5 "	...	...	3 " 5 "
" 7 "	...	...	5 " 10 "
" 1 case ...	...	...	10 years.

Certain persons had continued to work for the following periods "after being infected" :—

1 under	...	...	1 month.
10 from	...	...	1 to 3 months.
7 "	...	...	3 " 6 "
2 "	...	...	6 " 12 "
8 "	...	...	1 " 2 years.
4 "	...	...	2 " 3 "
4 "	...	...	3 " 4 "
2 "	...	...	4 " 5 "
2 "	...	...	5 " 6 "
1 "	...	...	7 " 8 "
1 for	...	...	9 years.

On examining the books at the Home for Consumptive Females in Gloucester Place, Portman Square, in October 1906, it appeared that one of the patients had recently died after a residence of 40 years, and at the date of my visit there were six patients still occupying beds who had become inmates as far back as 1873, 1878, 1879, 1881, 1883 and 1886, all these patients having, I was informed, previously been inmates of Brompton Hospital for Consumption.

Additional evidence as regards this curability of *recognised* phthisis could easily be set forth, but enough has probably been said to establish the proposition, and to show that the old French aphorism to the effect that "Consumption is a disease from which the rich sometimes but the poor never recover," although it contains more than a germ of truth, cannot be accepted as at all an adequate statement of the real position.

Although no very precise value can be attached to the foregoing figures, it is clear that the general impression conveyed by such figures should be borne in mind when interpreting statistics relative to the after-results of sanatorium treatment. Obviously a considerable number of persons with phthisis live and work for many years after the recognition of their ailment, and this independently of treatment in sanatoria.

CHAPTER VII.

THE INFLUENCE OF EARLIER RECOGNITION AND BETTER TREATMENT OF TUBERCULOSIS UPON THE DEATH-RATE FROM THAT DISEASE.

In considering the conditions which may have promoted the steady decline in the death-rate from phthisis which, as has been shown in Chapter II, has apparently taken place in England and Wales since the accession of Queen Victoria, the question arises whether the earlier recognition of the disease and, to a less degree, the better treatment of the malady, may not have influenced the fall of the death-rate to a greater extent than has hitherto been generally suspected.

As will be shown later the very essence of the successful treatment of pulmonary tuberculosis, alike in the interests of the individual and the community, is the early detection of the malady. That a very substantial advance in diagnostic skill has taken place during the last 50 years will probably be admitted. The discovery and increasing application of mediate auscultation of the chest through the instrumentality of the stethoscope must, *a priori*, be held to have led to the detection of pulmonary conditions which in days antecedent to Laennec (1827), would not improbably have passed unrecognised. And, further, the multiplication of centres of teaching and observation such as hospitals, infirmaries and dispensaries has resulted not only in a great advance in the ability as a diagnostician of the average medical practitioner with multiplication of facilities for obtaining medical advice, but in a fuller appreciation also on the part of the public of the importance of seeking medical advice at an early stage of illness.

These several factors are likely to have conduced to diseased conditions being identified earlier by the medical practitioner; so that in the case of pulmonary tuberculosis, where the early recognition and treatment of the disease is of such paramount importance in the sense of promoting the arrest of the malady and in postponing death, it would be surprising had no effect been produced upon the death-rate.

The fact must not be lost sight of that an individual suffering from consumption is liable, like other persons, to death from a variety of causes and that, consequently, the mere prolongation of a consumptive person's life must needs afford him opportunities of dying from some cause other than pulmonary tuberculosis.

The shifting of the maximum mortality from pulmonary tuberculosis from younger to older persons is consistent with a view that earlier recognition and better treatment may have enabled persons afflicted with this disease to live longer.

It has been contended by Professor Koch that the fact of discovery of the tubercle bacillus in 1882 has been responsible for much of the fall in the death-rate from pulmonary tuberculosis which has taken place, and no doubt there is something to be said for this thesis. But I have shown elsewhere that there are very few facts in support of such view; that the general tendency of the evidence indicates that the death-rate from pulmonary tuberculosis fell at a greater rate prior to the discovery of the tubercle bacillus than has been observed subsequent to that discovery. This fact would seem to suggest that the presence of the bacillus may not be such an overwhelming factor in the causation of the malady as was once supposed; that the resistance of the body to the bacillus is the *major* factor.

Obviously such inference detracts in no way from the brilliancy of Koch's discovery in an academical or historical sense. It merely indicates that nature is working very much in the same way since 1882 as she worked prior to that date, and that her clock does not act differently from the fact that, as regards tuberculosis, a small part of the face of the clock has become transparent.

It is however probable, notwithstanding the statistics furnished elsewhere in this volume upon the subject, that the better circumvention of the bacillus must *cæteris paribus* be leading to some reduction in the prevalence of the disease.

As regards the influence in diminution of mortality of advances in treatment, it is necessary to speak with great caution; there being danger of confusing with "treatment" measures other than those which may be properly regarded as therapeutic in a purely medical sense. Moreover, it has to be borne in mind that according to the statistics of England and Wales decline in phthisis mortality has been taking place ever since the introduction of civil registration in 1837; so that therefore it would be necessary, in order to establish the influence of treatment, to show that marked therapeutical advances had been made prior to the Victorian era. But in connection with later manifestations the remarks of Dr. Theodore Williams may be profitably referred to.

In insisting on the importance of adopting measures for improvement of the general health of the patient as contrasted with those directed solely to reducing the local manifestations of the malady, Dr. Theodore Williams furnishes the experience of his distinguished father, Dr. C. J. B. Williams, F.R.S.* This observer stated that during the first 10 years of his practice the beneficial effect of treatment was limited to incipient cases, and specially to those who were able at an early stage to take long

* Pulmonary Consumption; its etiology, pathology, and treatment, by C. J. B. Williams, M.D., LL.D., F.R.S., and Charles Theodore Williams, M.A., M.D., Oxon. Second edition, enlarged and rewritten by Dr. C. Theodore Williams. London, Longmans, Green & Co., 1887.

sea voyages, such as those to Australia and India; and he remarks:—

"My general recollection of the developed disease at that time is that of distressing tragedies in which no means used seemed to have any power to arrest the malady; and life was rarely prolonged beyond the limit of two years assigned by Laennec and Louis as the average duration of the life of the consumptive."

"In the next period of 10 years (from 1840-1850), a marked improvement took place in the results of treatment, apparently in connection with the allowance of a more liberal diet, &c., &c., It was in the latter half of this period that chemists began to produce cod liver oil of sufficient purity and freshness to be fit for the human stomach, and I have no hesitation in stating my conviction that this agent has done more for the consumptive than all other means put together."

In discussing the result of the treatment adopted in the case of 230 patients who wintered at various foreign health resorts, Dr. Theodore Williams adds:—

"The total duration of life among them from the date of the first symptoms, was for those who died, 8 years; for those still alive, nearly nine years. Of these, 40 took the oil irregularly, or not at all, of which number 17 died, giving a duration of 4 years 8½ months, little more than half the duration of life of the total number, yet in the commencement of treatment these cases were not more unfavourable than the rest.

"Other important constitutional influences succeeded in arresting and curing pulmonary consumption long before the discovery of the tubercle bacillus and its relation to the disease, and we must conclude that they acted by improving the bioplasm and increasing constitutional resistance."

Upon the whole, it must be considered probable that earlier recognition and better treatment of consumption have both had some effect in promoting the decline of deaths from tuberculosis. If this be the case it has an important bearing on the sanatorium problem.

It will now be convenient to discuss the growth of knowledge as regards the open-air treatment of pulmonary tuberculosis, and to show how unsuccessful attempts to establish such treatment have been made over and over again in the past.

CHAPTER VIII.

THE EVOLUTION OF THE SANATORIUM IDEA.

As has been the case with so many discoveries, and with expressions of thought in advance of the times, the doctrine of fresh air and nutritious diet in the treatment of consumption was preached long ago to a non-receptive world; its advocates raised their voices in what was in effect a non-responsive wilderness.

Again and again throughout past centuries there has come to the world a message of the curability of phthisis, and again and again has hopeful augury in this sense fallen upon stony ground, has been choked, as it were, by what was regarded as the overwhelming testimony of death to the contrary.

In so far as Great Britain is concerned it was more than a century and a half ago, in 1747, that a Scotch physician,* writing from the Highlands to his friends in London, insisted that the most important factor in the treatment of consumption was fresh air and diet; that medicine and climate, although of high value, should take rank as secondary measures only.

There are also other indications that the world is indebted to the acumen of the Scotch for the inception of the sanatorium idea. In the autumn of 1899, Dr. G. S. Middleton under the title of "A Note on the Minute Book of an Early Glasgow Medico-Chirurgical Society," gave an account in the Glasgow Medical Journal of a paper which was read before that Society upon the "Treatment of Consumption," by a Mr. Campbell in 1825. In this paper reference was made to a pioneer in the matter of the open-air treatment of phthisis, and it was elicited in a discussion which later on arose in the "British Medical Journal" that this pioneer was the Rev. Andrew Stewart, M.D., Parish Minister of Erskine.

In the same Journal for April 29th, 1905, Dr. James Finlayson stated that among a pile of manuscript left by the late Dr. Mackenzie, of Glasgow, he had found a paper endorsed in Dr. Mackenzie's handwriting, "Dr. Stewart's Treatment of Phthisis," a manuscript which had been transcribed for Dr. Mackenzie from the original, written by a consumptive patient undergoing Dr. Stewart's treatment. The complete text is given in the "British Medical Journal," of the date referred to. Here the more salient passages must suffice.

The paper sets out that Dr. Stewart's system consisted in pursuing a depleting course when the malady commences with acute inflammation; but that "when exhaustion and

* "A Letter from a Physician in the Highlands to his friends in London," dated 1747.

"nervous irritability comes on, with a fluttering pulse often varying, and night perspirations, he immediately attributes these symptoms to weakness and begins to support the constitution, and enables it to throw off the disease by its own rallying powers." To this end Dr. Stewart advised that vinegar and water should be rubbed into the skin night and morning, the object apparently having been to abstract internal heat, promote a healthy surface circulation, open the pores of the skin and mainly to "harden" the patient in the direction of defending "the constitution against fresh attacks of cold."

"In the old established practice, Dr. Stewart contends that the effect is pursued and not the cause; and that irritation of pulse and quickness of circulation, which are the effects of weakness, are treated as if they proceeded from inflammation, until the patient is reduced to a skeleton, and all the powers of the constitution are destroyed: thus co-operating with, and increasing, a disorder of which the destructive tendency and the ravaging powers are but too well known; but admitting that this old practice succeeds, and that the life is preserved, it is still but a system of palliation, for the extreme precaution necessary against the fear of taking cold makes the patient a complete hot-house plant, and implies a state of constant bondage. The climate cannot be brought to suit the constitution, therefore the constitution must be hardened to bear the climate, which can only be done by . . . restoring the frame to its original healthy tone and vigour . . .

"It is Dr. Stewart's urgent wish that the patients should be for many hours daily in the open air—cautioning, however, avoiding fatigue—either on horseback or on foot, or in an open carriage, which last he relies upon as being least likely to tire the patient. The diet should consist of plain meat, broth, pudding, fish, or any course of simple but nutritious food, according as the patient feels inclined . . .

"Dr. Stewart is anxious to explain that his system partakes not in the most remote degree of the Brownian or cramming system; he is altogether hostile to it, or to any undue means of giving strength by false stimuli; he only prescribes that moderate quantity of refreshing food which nature and reason point as wholesome, and those early and regular hours which are most efficacious to digestion."

Apparently the vinegar and water washing referred to in the first portion of the paper had the effect of inducing sleep largely, perhaps, by lowering the temperature; but it was also intended as a preliminary to the introduction of the cold shower or plunge bath, or "what is best of all, the open sea." Indeed, there is here perhaps the first indications of modern hydrotherapy as applied to phthisis.

Dr. William Mitchell, writing from Bradford in the "British Medical Journal" of June 16, 1905, calls attention to the fact that in a *Treatise on Domestic Medicine* which was written by Dr. William Buchan in 1783, and dedicated to Sir Joseph Banks, Bart., President of the Royal Society, the following passage is to be found:—

"On the first appearance of a consumption, if the patient live in a large town or any place where the air is confined, he ought immediately to quit it and to take choice of a situation in the country where the air is pure and free. Here he must not remain inactive, but take every day as much exercise as he can bear. The best method of taking exercise is to ride on horseback, as this gives the body a great deal of motion without fatigue. Such as cannot bear this form of exercise must use

the carriage. A long journey, as it amuses the mind by continual change of objects is greatly preferable to riding the same ground over and over."

As an illustration of the fact that Buchan attached more importance to open-air treatment than to diet and drugs, Mr. Mitchell quotes the following passage, which brings out, in addition, the high value which was then set upon milk :—

"Next to proper air and exercise we would recommend a due attention to diet . . . he must keep chiefly to the vegetables and milk. Milk alone is of more value in this disease than the whole *materia medica*. . . ."

And, referring to some Sheffield cases, Buchan states :—

"I have frequently seen consumptive patients who have been sent to the country with orders to ride and live upon milk and vegetables return in a few months quite plump and free from any complaint."

It appears, too, that Dr. Benjamin Rush, of Philadelphia, who was regarded by his compeers as the "American Sydenham,"* writing in vol. I. of *Medical Inquiries and Observations*, in 1794, discussed current doctrines with regard to the treatment of consumption, but I have been unable to procure a copy of his work.

But in 1815 Sir Thomas Young wrote : "Even with the utmost powers of all perhaps not more than one in a hundred will be found curable."

The next reference in a chronological sense, to the subject was, I gather from Dr. T. N. Kelynack's interesting brochure on "The Sanatorium Treatment of Consumption," made by an American named Parrish, who wrote in 1830. While advising exercise in the open air he added :—

"Nor should the weather be scrupulously studied. Though I would not advise a consumptive patient to expose himself recklessly to the several inclemencies of the weather, I would nevertheless warn him against allowing the dread of taking cold to confine him on every occasion when the temperature may be low or the skies overcast."

Apparently the message which first came from Scotland in 1747 was more than a century before its time ; for when nearly a hundred years later, in 1840, Messrs. Longmans published for Mr. George Bodington, of Sutton Coldfield, Warwickshire, an "Essay on the Treatment and Cure of Pulmonary Consumption, on Principles, Natural, Rational and Successful,"† the medical profession was little more prepared to consider the question seriously than it was when the Scotch physician's letter crossed the border nearly a hundred years earlier.‡ But Bodington carried his views into actual practice ; and he must, it appears, be regarded as the father of the sanatorium idea, in so far as that conception is associated with abundance of fresh air, the

* Public Hygiene in America, by Henry I. Bowditch, M.D. Boston, 1877

† This essay may now be procured separately ; it was re-published in the "Selected Essays and Monographs" issued by the New Sydenham Society in 1901, vol. 172.

‡ See review of Bodington's book in *The Lancet* of July, 1840.

aggregation of the patients into a common building for purposes of treatment and supervision, and a regime which was opposed to the "antiphlogistic" treatment of the day.

As one of Bodington's main principles in treatment was based upon a nutritious rather than a depressing diet, justice to his memory and the historical interest of the subject demands the quotation of the following passage :—

"Sir James Clarke rather sarcastically alludes to what he terms the *beef steak and porter system*, which he decidedly condemns, apparently guided by the "phlogiston" theory. I could never recommend porter and beef steaks to any person suffering from tubercular consumption—not from any preconceived notion of 'phlogiston,' but on accord of its very grossness and unfitness for a consumptive patient. On the other hand neither could I recommend to such an one, from a prejudice in favour of the aforesaid theory of 'phlogiston,' a meagre diet of vegetables, beer and water, aided by tartarised antimony, etc. I should recommend to one thus consuming away under the influence of this *wasting disease*, a nutritious diet of milk, fresh animal and farinaceous food, aided by the stimulus of a proper quantum of wine having regard to the general state and condition of the patient. If this is to be called the *beef steak and porter system* then I am guilty of patronizing it, but to my mind it rather has the character of a preservative system, whilst the wasting plan is as much entitled to be called the destructive one."

Bodington, too, saw clearly in 1840 what Brehmer recognised some 15 years later, but which even in these days is not perhaps sufficiently borne in mind in certain sanatoria, i.e. the necessity for constant medical supervision.

In the introduction to his work he tells us that with the view of testing his thesis he had taken a suitable house near his residence for the reception of patients, and that he hoped, by "almost hourly" watchfulness over the patients by a medical superintendent, that the treatment would compare favourably with that "obtained by the removal of the patients to a boarding-house or hotel *merely for change of scene*." He trusted that his plan would "meet the approbation of the medical profession."

As to his work Bodington says :—

"This essay has no pretension to a complete or perfect work on the subject of which it is composed; much of it is the substance of reminiscences of occurrences which took place several years since; but it has this to be said in its favour, with regard to the cases related, that the individuals who were the subjects of them are alive and in good health at the present day, thus showing that the disease will admit not only of palliation but of cure. Some of those individuals were despaired of by professional men of eminence who were acquainted with the state of their health previous to their undergoing the treatment under which they recovered; and I know, and their friends know, that opinions adverse to any hope of their recovery were expressed."

After discussing the then prevalent mode of treatment by antiphlogistic agencies, by shutting up in closed rooms and by the inhalation of gases of various kinds, Bodington proceeds :—

"The only gas fit for the lungs is the pure atmosphere freely administered, without fear; its privation is the most constant and

frequent cause of the progress of the disease. To live in and breathe freely the open air, without being deterred by the wind or weather, is one important and essential remedy in averting its progress, one about which there appears to have generally prevailed a groundless alarm lest the consumptive patient should take cold. Thus, one of the essential measures necessary for the cure of this fatal disease is neglected from the fear of suffering or increasing another disease of trifling importance. No two diseases can be more distinct from one another than consumption and catarrh. It is the latter only which might be caught by exposure to atmospheric causes; with the former they have nothing to do. Farmers, shepherds, ploughmen, &c., are rarely liable to consumption living constantly in the open air, whilst the inhabitants of the towns and persons living much in close rooms within doors are its victims. The habits of these latter ought, in the treatment of the disease, to be made to resemble as much as possible those of the former class as respects air and exercise, in order to effect a cure. How little does the plan of shutting up patients in close rooms accord with this simple and obvious principle.

"The equal temperature so much considered and said to be necessary should be that of the external air instead of that so commonly employed, the warmth of a close room.

"The common hospital in a large town is the most unfit place imaginable for consumptive patients."

Bodington's ideas as to the site for a sanatorium and for the course of treatment to be adopted there were as follows:—

"The neighbourhood chosen should be dry and high, the soil generally of a light loam, on sandy or gravelly bottom; the atmosphere is in such situations comparatively free from fogs and dampness. The patient ought never to be deterred from the state of the weather from exercise in the open air

"The cold is never too severe for the consumptive patient in this climate; the cooler the air which passes into the lungs the greater will be the benefit the patient will derive. Sharp frosty days in the winter season are most favourable."

He had, too, a clearer insight into the whole problem and the difficulties of sanatorium treatment than he has been hitherto credited with. He saw what we in England are only now beginning to appreciate, *i.e.*, that—

"Connected with such a hospital (this word would now be written sanatorium) provision should be made for the employment of the convalescent and cured patients, who ought never to return to their former occupation, but should be employed after as agricultural labourers, gardeners, or in any other pursuit rather than return to their former occupations."

Bodington, born at the close of the eighteenth century was before his age; his views were ridiculed and his sanatorium, owing to the fact that his consumptive patients were driven from it, turned into a lunatic asylum. But he recognised clearly long before the publication of his essay in 1840 what was appreciated in Germany some 25 years later. In a private letter to his son in 1866 he wrote:—"I often think that, when I am dead and buried perhaps the profession will be more disposed to do me some justice than whilst I lived."

He died at Sutton Coldfield, near Birmingham, on February 5th, 1882 (the year in which Koch discovered the tubercle bacillus) in his 83rd year, "a well known and widely respected

practitioner"; and but for the circumstance that after his retirement from practice the Journal of Public Health in 1857 did justice in its columns to Bodington's work, England might have remained oblivious of the fact that the sanatorium movement had its birth within her shores.*

I have quoted thus largely from Bodington's essay because even at this hour the extent of his insight into the sanatorium problem is perhaps not as fully appreciated by his countrymen as could be wished.

But as an illustration of posthumous justice, it may be mentioned that a quarter of a century after Bodington's death (on July 26th, 1907), a Medical Inspector of the Local Government Board, after holding an inquiry in the Town Hall, Birmingham, into an application on the part of the Town Council for sanction to erect a sanatorium was presented with a copy of Bodington's Essay, the fact of Bodington having been a Birmingham man being referred to with pride. To Birmingham, therefore, belongs the honour of having been the first sanitary authority in this country to take practical steps for the erection of a municipal sanatorium, and it is of historical interest to note that the Town Hall is within a very few miles of the house which Bodington used as his sanatorium.

In the year 1855, another British subject, Dr. Henry MacCormac (father of the late Sir William MacCormac, Bart., President of the Royal College of Surgeons), endeavoured to pierce the gloom which hung around the consumptive by the publication of an essay on "The Nature, Treatment and Prevention of Pulmonary Consumption, and incidentally of Scrofula, with a Demonstration of the cause of the Disease," which essay he dedicated to Dr. James Copland. As to the curability of consumption MacCormac wrote:—

"I am perhaps the only physician of my time and standing, possibly the only one, who is intimately and entirely convinced that the disastrous and wretched malady which it is the object of these pages to illustrate, is not only when taken early very often removable, but, what is of still greater importance, that with proper means and appliances it is in every single instance preventable. In no instance in the wide history of disease has medical investigation, I conceive, fallen into greater misconception than in overlooking to the extent they have done the influence of foul air in the etiology of consumption. . . . The continuous or prolonged respiration of a foul unrenewed atmosphere, namely, is the ever urgent ceaseless source of tubercle. . . . And here I must implicitly and distinctly declare that the medical man or patient who desires to realise a recovery in phthisis whatever be the agent employed, but neglecting to enforce day and night, ever and always, the respiration of a perfectly pure and untainted atmosphere, an atmosphere renewing and revivifying the blood, need hope for no success. . . . The simple rule is, let the chamber atmosphere be pure and untainted as the open air, in which indeed the patient should spend as much time as his strength, the weather, the season, and his means will permit."

* See the obituary notice in *The Lancet* of March 11th, 1882.

MacCormac then insists upon the groundlessness of the fear that this fresh air will lead to "taking cold," and as to the belief that damp night air is in itself a cause of consumption, he observes :—

"The respiration of the coldest, dampest air will never, never did since the world began, induce consumption. It is only the respiration of dirty, foul, unrenewed air that induces consumption, else, so far as this is concerned the coldness or the warmth, the dryness or the dampness makes no sort of difference. If only the air be pure, however cold, however damp, however dry, there will be no consumption. . . . Contrary to the general prepossession, air is as good, nay better, by night than by day. . . . Impure night air kills, just as impure day air kills. Not so pure night air, which should be most freely admitted into the chambers of the consumptives, until the air in their chambers shall be as pure and as fresh, else heated at pleasure, as the air outside the chamber beneath the free heavens."

MacCormac was a fighter and he continued his fight against ignorance and bias even up to the age of 82. He wrote several treatises, including an "Exposition of Continued Fever," "Moral Sanatory Economy," and "Philosophy of Human Nature," and in 1861 he read a paper before one of the medical societies of London upon the "Absolute Preventability of Consumption" * while in 1865 he published a second edition of his work which he dedicated to his son.†

The next English writer was Sir Benjamin Ward Richardson,‡ who appears to have possessed a very clear conception of the sanatorium idea when he wrote :—

"If special hospitals for consumption are to be had they should be as little colonies, situated far away from the thickly populated abodes of man and so arranged that each patient should have a distinct dwelling for himself. They should be provided with pleasure grounds of great extent, in which the patients who could walk about should pass every possible hour in the day ; and with glass covered walks overhead, where the open air could be freely breathed even if rain were falling."

To a certain extent this is the first part of the story as regards sanatoria in so far as Great Britain is concerned. But it has, of course to be held in view that what may be deemed the fresh air idea received to some extent practical application in England as far back as 1791 when the Royal Sea-Bathing Infirmary for Scrofula was erected at Margate, and again in 1855 when the National Hospital for Consumption was erected at Bournemouth.

Although the teachings of Bodington and MacCormac found no acceptance in their own country it was otherwise with these same ideas when transplanted elsewhere.

* The Prize Essay on the erection of a Sanatorium for the Treatment of Tuberculosis in England, by Arthur Latham, M.A., M.D., Oxon., M.A., Cantab., in association with A. William West.

† "The Cure of Consumption" (according to George Bodington and Henry McCormack), by Charles Gaskell Higginson, M.A., L.R.C.P., (Lond.), Percival Jones, Limited, Birmingham, 1905.

‡ "The Hygienic Treatment of Consumption," by Benjamin W. Richardson, M.D. London, John Churchill, 1857.

Hermann Brehmer, contrary to the prevailing opinion, was strongly convinced of the curability of phthisis. He had been attracted by the writings of Bodington (it is doubtful, it seems, whether he was in the first instance aware of MacCormac's work), and 14 years afterwards, i.e. in 1854, he was able, notwithstanding very powerful opposition, to give expression to them in Germany by the erection of a small sanatorium in Silesia.

Brehmer's success in this matter was probably due largely to the fact that while himself a keen fighter he had powerful friends who were able to aid him in attaining his object.

In 1856 he devoted the thesis for his final degree to the subject of tuberculosis, its title being "*Tuberculosis primis in stadiis semper curabilis*," and in 1859 he founded the famous sanatorium of Görbersdorf in Upper Silesia, near the Bohemian frontier, an institution which subsequently became the largest establishment of its kind in the world.

Of Görbersdorf, Dr. F. Rufenacht Walters says in the last edition of his admirable work on "*Sanatoria for Consumptives*," which was published in 1905:—

"The sanatorium grounds are probably the finest in existence, and the place will always be of special interest to practical physicians as the first in which the hygienic methods of treatment of consumption were systematically carried out and the value of 'closed sanatoria' demonstrated."

The grounds were arranged largely to meet the views which Brehmer had accepted from Rokitsansky as to the causation of pulmonary tuberculosis. Arguing from what was subsequently found to be a fallacy, that there was no consumption above a certain altitude, Brehmer inferred that this immunity was the result of the large hearts possessed by those who lived at such elevations. It was therefore believed that the small heart was one of the greatest predisposing causes of phthisis, and that in order to cure and prevent it by such regulated exercise in elevated situations as are calculated to strengthen and enlarge the heart and augment the cardiac power.

Brehmer recognising too, as had many who preceded him that the disease was largely promoted by the absence of fresh air, inferred that an abundance of such air would be likely to induce recovery or to arrest the malady, and he laid down the following conditions for the treatment of phthisis.*

1. A life spent in the open air under conditions which give immunity from tuberculosis.
2. Complete freedom from any debilitating circumstances or anything which may lead to an exacerbation of the disease.

* The Prize Essay on the Erection of a Sanatorium for the Treatment of Tuberculosis in England" by Arthur Latham, M.A., M.D. Oxon., M.A., Cantab., in association with A. William West, Architect. Baillière, Tindall & Cox, London: 1903.

3. Methodical hill-climbing as an exercise, when the condition of the patient renders this desirable.
4. An abundant dietary, in which milk, fatty foods and vegetables occupy an important place.
5. Various hydro-therapeutic measures.
6. Constant and unremitting medical supervision.

Brehmer attached to the site of the sanatorium a definite importance; he thought that such a building should be situated in a mountainous district, where there was by nature little or no phthisis amongst the inhabitants. His treatment, which may be called the "physico-dietetic," endeavoured to meet loss of weight by abundant fatty foods. The tone of the muscles, and especially those of the heart, was to be increased by regulated exercise, augmented each day while always stopping short of fatigue; and it was sought to excite the functions of the skin, and to harden the patient by hydropathic treatment. The treatment should, he thought, be regularly supervised even hourly, if necessary, and for this reason it was necessary to provide a "closed sanatorium." At first this treatment was not taken seriously by the medical profession as a whole, and Brehmer was only sustained in his work by the unwavering support of patients who had been under his care.

One of Brehmer's patients at Görbersdorf was Dr. Peter Dettweiler, who developed consumption while acting as an army surgeon in the Franco-German war in 1870. This patient subsequently became Brehmer's assistant and stayed with him at Görbersdorf for six years, after which he founded the almost equally famous institution of Falkenstein in the Taunus Mountains, the sanatorium which has been spoken of as "the Mecca for students of modern phthisiotherapy all over the world."* Indeed there is no doubt that the fame of Dettweiler and the accessibility of Falkenstein from Western Europe have been largely instrumental in furthering the sanatorium idea in Europe and America.

In a very large measure, too, Dettweiler may be regarded as the father of sanatoria for the poor; he was the founder of Ruppertshain, which was the first institution of this class erected (commenced in 1892) for the poor in Germany. It was owing largely to the stimulating influence of Professor von Leyden that a movement was commenced to erect popular sanatoria on the same lines as Ruppertshain. Associated with the name of von Leyden must be mentioned Professor Pannwitz, Privy Councillor Bielefeldt, and Herr Gebhart; the two latter of whom have done so much to stimulate the erection of sanatoria in connection with the workmen's insurance system in Germany.

* Consumption; its relation to man and his civilization; its prevention and cure, by John Bessner Huber, A.M., M.D., Philadelphia. London, J. B. Lippincott & Co., 1906.

Dettweiler's influence has been very far reaching. He was instrumental in modifying Brehmer's treatment by substituting rest in a reclining chair for certain cases which, under Brehmer's régime, might have been treated with exercise. He expressed the opinion that it was not essential for a sanatorium to be situated in a region free from phthisis, and he thought that the disease might be cured in a climate where the patients would be exposed to the sun in a forest amidst pure and dustless air. Dettweiler may, indeed, be regarded as having added the "rest cure" to the factors regarded by Brehmer as being essential in sanatorium treatment. He accentuated, too, the essential importance of adequate medical supervision, and he is quoted by Knopf as having said that—

"The medical director of a sanatorium for consumptives should not take upon himself the responsibility of such a position unless he is fully prepared, and honestly feels, that he can excel his co-workers in strength, creative power, discretion, faithfulness and duty."

Dettweiler, dying in 1904, lived to see Germany covered with sanatoria for the working classes, and although as will be seen later the number of such institutions is largely due to the insurance laws in force in that Empire, much of the credit of initiating the movement was due to him.

Although, doubtless, the teachings of Brehmer and Dettweiler have had a great effect in promoting the erection of sanatoria in this country, I am inclined to agree with Dr. Kelynack that the Nordrach Colonie near Biberach in the Black Forest has been also largely responsible for the movement. This I imagine is mainly due to the fact that this Black Forest sanatorium, which was founded in 1888, is the one which for one or another reason has attracted most attention in this country, and numerous references have been made to it in the medical press during the last ten years.* The influence exerted by this institution is exemplified by the circumstance that there are now many "Nordrachs" in the British Isles, and several of our private sanatoria have been inaugurated and are still under the control of medical men who have themselves been under treatment at the Black Forest sanatorium, where they have learned from Dr. Walther the principles of "open-air" treatment.

Certain lay journals and magazines devoted articles to the subject in 1895 and 1899, and Mr. C. G. Higginson, who has a very intimate knowledge of the sanatorium question, has called my attention to some of the earliest† in an article in the "Nineteenth Century" of January, 1899, by Mr. James Arthur

* See article by Dr. Reinhardt in "British Medical Journal" of August 7th, 1897, and by Dr. Mander Smyth in the same journal for October, 1898.

† "Consumption Curable," an article signed Physician and Surgeon, and appearing in "The Ladies' Field" of September 28th and October 5th, 1895. "The open-air cure of Consumption—a personal experience," by James Arthur Gibson. "Nineteenth Century," No. CCLXVIII., January, 1899.

Gibson, himself a consumptive patient at Nordrach, in the year 1895. The author's happy experience led him to take a somewhat optimistic view of sanatorium treatment, and to generalise in these words :—

"Perhaps the best way for me to treat this subject is to start with my own case, and then to show how it is possible to save practically every consumptive person in this country if only public interest could be aroused and the necessary means employed to bring about a result so desirable from every point of view."

And again he states :—

"I emphatically affirm that consumption is not a fatal disease, that not a single life should be lost through it if only the proper means of grappling with it were employed."

I find by referring to the back volumes of the "Nineteenth Century" that Mr. Gibson's article drew forth a rejoinder from Dr. J. G. Sinclair Coghill in the next number of the same review,* but it is possible that Mr. Gibson's first article (he made a reply to Dr. Coghill in the March number of the "Nineteenth Century") may have had the effect of producing amongst the laity the exaggerated conceptions as regards the value of sanatoria which are sometimes heard expressed.

From Germany the sanatorium idea seems to have spread in the first instance to the United States of America, where it took root largely owing to the fact that Dr. Edward L. Trudeau, himself a consumptive, was in 1873 sent by Dr. Loomis to winter in the Adirondacks with the view to the prolongation of his life.

In an address delivered in October, 1903, under the auspices of the Henry Phipps Institute,† Dr. Trudeau said :—

"Thirty years ago, when I went into the Adirondack wilderness to try to prolong my life, nothing would have seemed more improbable than that I should have lived to avail myself of the great honour of addressing you on such an occasion as this, or that anything which could occur in a life spent in those remote and primitive surroundings might be considered by the Managers of the Phipps Institute at all worthy of your attention to-night."

At that time, in 1873, Dr. Trudeau states that the climatic treatment was within the reach of the well-to-do, but that even they were only sent away almost as a last resource. "The poor and the large class of men and women who depend upon their daily work for their support were left to their fate. No special stress was laid on the early recognition of the disease as it was generally believed to be fatal." It was Dr. Alfred Loomis who persuaded Trudeau to remain in the then almost inaccessible Adirondacks during the winter; and with the result that in the spring of 1874 the patient, like some others, was so much improved in health that Dr. Loomis in 1876 published an article in the "Medical

* "The Prevention of Consumption," by Dr. J. G. Sinclair Coghill, "Nineteenth Century," February, 1899.

† First Annual Report of the Henry Phipps Institute for the Study Treatment and Prevention of Tuberculosis.

Record" on the climatic value of the Adirondacks for pulmonary tuberculosis.

Trudeau spent the succeeding 30 winters in this remote region, and it was owing to the benefit which he thus derived and to the influence which Brehmer's views had exerted upon him that he conceived the idea of founding a sanatorium in the region in question. In 1884, with the money which he had collected from various sources, he began the erection of a small building which formed the nucleus of the now world renowned "Adirondack Cottage Sanatorium."

From this history of the treatment of phthisis it would appear that during several centuries the conception of fresh air and nutritious diet was seeking expression, though those who advocated fresh air appear to have done so almost without knowing it. Thus, throughout the literature of tuberculosis numerous references are to be found as to the bad effects of impure air in the causation of phthisis, whereas the logical inference as to the importance of pure air in the treatment and prevention of phthisis does not seem to have been recognised.

It has been the same with other new ideas; as for instance the theory of Evolution, a theory which only found acceptance when the world was ready for it.

Hippocrates when he advised long rides on horseback and Aretæus and Celsus when they recommended sea voyages were entertaining the sanatorium idea. Laennec, too, in his *Auscultation Mediate* seems to have been in like case when he said that we had no better means of opposing phthisis than sailing about or living by the sea shore in the mild season.

Before proceeding to a consideration of the effect of sanatorium treatment, it will be useful to furnish a brief account of the provision of sanatoria in England and Wales, and of the powers possessed by local authorities for erecting or providing such institutions. The next two chapters will, therefore, be devoted to these subjects.

CHAPTER IX.

THE EXISTING PROVISION OF SANATORIA AND HOSPITALS FOR CONSUMPTION IN ENGLAND AND WALES (WITH MAP SHOWING DISTRIBUTION OF SUCH INSTITUTIONS IN 1907).

There is an initial difficulty in determining what institutions are to be regarded as "sanatoria" and what are to be termed "hospitals," seeing that practically all hospitals for consumption have now made some attempt towards carrying out the "open-air" treatment. Although the situation of certain of these hospitals is not ideal from a sanatorium standpoint, it is clear that by adoption at them of open-air methods of treatment generally, the modern sanatorium regime can be to a large extent realised and relatively good results obtained even in an atmosphere such as that which surrounds St. Thomas's Hospital, London,* and the Royal Infirmary, Sheffield.†

The difference between a modern consumption "hospital" and a sanatorium being therefore only one of degree, and, as it is convenient, if indeed it be not necessary to fix in this matter a somewhat arbitrary standard, I am here regarding hospitals for consumption, as also homes, &c., for advanced cases of the disease, as "sanatoria."

With reference to a difficulty in determining what are "public" and what are "private" sanatoria, I have for the purposes of this report regarded as "public" sanatoria mainly institutions erected or provided by public or private philanthropy, by the State, or by local authorities or associations.

Although in the list which will be found on the map which follows and at the commencement of Part II. I have not always adhered strictly to this definition, the instances in which I have deviated from it are few. The exceptions in question have concern with certain private sanatoria in connection with each of which the promoter has also established a sanatorium for the poorer classes. The few institutions thus correlated with private sanatoria are really strictly philanthropic institutions, which have been initiated or are carried on by medical superintendents of the adjoining private sanatoria. In every instance the poorer institution is topographically separate from the private venture with which it is to some extent administratively associated.

I have also included "Pinewood" sanatorium in the "public" group because although the fees at the latter institution are

* Open-air Treatment of Phthisis in London, by Hector Mackenzie, M.A., M.D., F.R.C.P., Physician to St. Thomas's Hospital and to the Hospital for Consumption, Brompton.

† The Consumptive Working Man: What can Sanatoria do for him? by Noel Dean Bardswell, M.D., M.B.C.P., F.R.S., (Edin.), Medical Superintendent, King Edward VII. Sanatorium. London. The Scientific Press, Limited, 1906.

higher than can be afforded by the poorer classes as here understood, the institution was erected out of funds furnished by the munificence of private donors.

Within the same group will be found the Edward VII. Sanatorium, because at this institution, notwithstanding the high character of the accommodation provided, the patients pay only the very moderate sum of two guineas weekly. Moreover the whole cost of erection was defrayed by a private donor.

A further reason for embodying the sanatoria referred to above among the institutions termed "public" is the fact that this report will contain no descriptive account of "private" sanatoria. Consequently it is a question of either omitting all description of the sanatoria in question, or including them under the "public" sanatoria.

This report is confined to "public" institutions largely owing to the exigencies of space. But it may also be observed that the data to be obtained from private sanatoria relate to a class which, generally speaking, is competent to secure and maintain its own interests, and no question of the expenditure of public funds or monies collected for charitable purposes arises. For the most part, too, private sanatoria consist of existing houses and grounds which have been modified and added to in such fashion as to serve the purpose of sanatoria.

It will be seen by reference to the map which I have prepared showing the distribution of "public" and "private" sanatoria in England and Wales, that there are at the present time many of them in existence. Their number, too, is steadily, although not rapidly, increasing.

All the public sanatoria properly so called have been erected within the last seven or eight years. No "public" sanatoria in the modern sense of the term existed prior to 1899, and no "private" sanatoria antecedent to 1898.

It is, however, of interest historically, and to some extent etiologically, to note that special institutions in this country for tuberculous patients date back to the eighteenth century, and I have below arranged the more important of what I may call these "pre-sanatorium" institutions according to the date of their foundation :—

Royal Sea Bathing Hospital, Margate	... 1791
Royal Hospital for Diseases of the Chest (City Road)	... 1814
Brompton Hospital for Consumption	... 1841
Western Hospital for Incipient Consumption, Torquay	... 1850
City of London Hospital for Diseases of the Chest, Victoria Park	... 1851
National Hospital, Bournemouth	... 1855
Mount Vernon Hospital for Consumption	... 1860

Home for Consumptive Females, 57 and 58,	
Gloucester Place, Portman Square	... 1863
Liverpool Hospital for Consumption	... 1864
Royal National Hospital, Ventnor	... 1867
Manchester Hospital for Consumption	... 1875
St. Joseph's Hospital, Chiswick	... 1875
St. Michael's Home, Axbridge	... 1878
St. Catherine's Home, Ventnor	... 1879
Hahnemann Home, Bournemouth	... 1879
Eversfield Hospital	... 1884
Manchester Sanatorium at Bowdon	... 1885
Mildmay Convalescent Home, Torquay	... 1886

It is interesting to note that it was to the few institutions mentioned above that Professor Koch, in his memorable London address in 1901, attributed the remarkable fall in the tuberculosis death-rate which has taken place in this country. The number of these institutions is altogether insufficient to account for this fall which it may be observed by a reference to Chapter II. was in progress even antecedent to the founding of the Brompton Hospital for Consumption in 1841.

The sanatorium movement, in so far as public institutions are concerned, commenced in the north, in Durham and Westmorland, and from there it has spread gradually to the south.

It must be said of the sanatoria as a whole that they comprise a very heterogeneous collection of buildings. Some such establishments consist of already existing houses, slightly modified in the direction of the admission of more light and air, and of the substitution, in some cases, of impermeable for permeable surfaces; others are special institutions which in the opinion of many persons have been erected upon a too extravagant scale. Some accommodate half-a-dozen patients, some as many as a hundred.

A nearly similar diversity obtains as regards the sites upon which these institutions are erected. Some are in elevated situations, others are near the sea level. Between these two extremes are found the main bulk of the sites.

Means by which these public institutions have been promoted.

A large number of the "public" sanatoria at present existing in England and Wales have been promoted in the first instance at least by local branch of the "National Association for the Prevention of Consumption and other Forms of Tuberculosis," a fact which will be apparent by a reference to the account of the several institutions which is given in Part II. of this report.

To a large extent this is equivalent to the statement that public subscription has promoted the erection of many existing sanatoria, and, indeed, it may be added that a spirit of philanthropy is largely responsible for the partial maintenance of these

institutions. This, for instance, may be said to be the case of such institutions as the Westmorland and Cumberland sanatoria in the north, the Worcestershire Sanatorium in the Midlands, the Kelling Sanatorium in the east, and the West Wales Sanatorium in the west.

Private philanthropy has provided for the erection of some of the most sumptuous among these institutions, and in this class may be mentioned the Manchester and Liverpool sanatoria in Delamere Forest, Northwood Sanatorium in Middlesex, Pinewood Sanatorium in Berkshire, Daneswood Jewish Sanatorium in Bedfordshire, and lastly in point of time, the King Edward VII. Sanatorium in Sussex.

It should be added that in several instances where the sanatorium has been erected by public subscription, the site has been given by a benevolent landowner, or other wealthy benefactor.

Boards of guardians have been directly responsible for only two fully equipped sanatoria; that for the Liverpool guardians at Heswall on the Dee, and that for the Bradford board of guardians near Skipton in Yorkshire. In connection with this latter institution arrangements have been made whereby the guardians of the Keighley and Skipton Unions may secure the right to nominate patients to six beds.

Mention may, however, be made of the fact that, although only two boards of guardians have erected definite sanatoria, a considerable number of poor law authorities throughout England and Wales have now either erected special buildings for pulmonary tuberculosis within their own grounds, or allocated certain wards to the treatment of the tuberculous poor. Some form of "open-air" treatment is becoming common in workhouses and infirmaries, and in certain instances, as will be seen shortly, boards of guardians have secured the use of beds for their tuberculous sick at one or other of existing sanatoria.

As regards other local authorities, whether county, borough or district councils, none have, within my knowledge, actually erected a sanatorium for consumption, although this subject has been seriously considered by several county and borough councils, as well as by urban and rural district councils. The Corporation of Sheffield is utilising an existing house for certain of its tuberculous sick, and the City of Birmingham has acquired a site for the erection of a sanatorium in Gloucestershire.

Although, however, this is the case generally as regards both boards of guardians and local sanitary authorities with reference to the actual provision of sanatoria, it has to be mentioned that a not inconsiderable number of such authorities have in the past maintained and are now maintaining beds at existing institutions of this character.

Perhaps the most public and, in a sense, the most interesting example in this sense is the Bristol Corporation, which has,

with the consent of the Local Government Board after local inquiry, borrowed £5,000 from the public funds wherewith to purchase 20 beds at the Winsley Sanatorium, an institution erected by public subscription for the consumptive sick of the three counties of Wiltshire, Gloucestershire and Somersetshire. By virtue of this purchase the Bristol Corporation becomes part owner of the sanatorium in question, and by a further annual payment of £65 per bed for maintenance the Corporation is entitled to have 20 patients always in residence at the sanatorium.*

The Highworth and Cirencester Rural District Councils have also purchased a bed each at Winsley out of money borrowed with the consent of the Local Government Board, and are contributing £65 per annum in each instance out of the local rates.

So far as I am aware these are the only three local sanitary authorities who have up to the present purchased beds at any sanatorium out of money borrowed at a low rate of interest on the security of the rates (*see* Public Health Act, 1875, sections 233 and 234).

But, as will be seen by the subjoined list of supporters of the Winsley Sanatorium, other local authorities and bodies have purchased beds at a cost of £250 per bed out of current rates, and are from the same source maintaining patients therein.

The City of Manchester has secured 20 beds at the "Crossley" Sanatorium in Delamere Forest, and the City of Newcastle has under consideration the question of securing 20 beds at the Barrasford Sanatorium in Northumberland.

WINSLEY SANATORIUM (1905).

Special Payments for Reserved Beds to March 31st, 1906.

			£
Bristol Corporation	... 20 beds allocated	...	5,000
Bath	" ... 2 "	...	500
Swindon	" ... 2 "	...	500
Gloucester	" ... 1 bed	...	250
Highworth R.D.C.	" ... 1 "	...	250
Cirencester R.D.C.	" ... 1 "	...	250
J. S. Fry & Sons	" ... 1 "	...	250
Employés G.W.B., Swindon	" ... 1 "	...	250
Mr. and Mrs. W. S. Clarke	" ... 1 "	...	250
Mr. J. B. Clarke	" ... 1 "	...	250
Sir George White, Bart. (Bristol Tramways Company)	" ... 1 "	...	250
Mr. G. Lysaght	" ... 1 "	...	250

* Owing to the actual cost of Winsley Sanatorium having been materially in excess of the estimated expenditure, the Bristol Corporation is seeking sanction to increase its capital contribution.

Other allocated beds at Winsley are accounted for among local centres of philanthropic effort as follows :—

Cirencester Town	...	...	1 bed allocated	...	£ 250
Bradford-on-Avon and Trow- bridge	...	...	2 beds	...	500
Salisbury and South Wilts	...	...	1 bed	...	250

Numerous local authorities and boards of guardians in different parts of the country have, too, by annual contributions supported patients at sanatoria, although these authorities have not by the payment of a capital sum purchased an interest in any such institution.

One of the best illustrations of action in this sense is afforded in connection with the Durham Sanatorium, which has been successful in obtaining the support of a large number of local authorities ; and as the facts with regard to this institution may be of interest to local authorities throughout the country, I subjoin a statement relative to the matter :—

DURHAM SANATORIUM (1905).

	Beds.	Patients.
Sunderland Corporation	2	13
Gateshead	2	10
Jarrow	1	6
Chester-le-Street Rural District Council	1	5
Easington	—	1
South Shields	—	1
South Shields Guardians	2	9
Weardale	—	1
Bradford	—	7
Darlington	—	1
Lanchester	—	8
Bishop Auckland	—	4
Gateshead	—	2
Durham	—	4
Middlesbrough	—	4

In addition to the above, subscribing workmen sent 40 patients to the Durham Sanatorium during 1905.

A further and instructive illustration is afforded by the Westmorland Sanatorium, the subscription list of which brings out the fact that, in addition to beds supported by local authorities and boards of guardians at an annual payment of £60 per bed, districts and groups of districts have been able, altogether apart from their district councils or their boards of guardians, to subsidise beds.

WESTMORLAND SANATORIUM (1906).

Local Authorities.	Beds.	District Enterprise.	Beds.
Kendal Corporation	1	Milnthorpe, Arnside and	1
South Westmorland R. D. C.	1	Beetham.	
Kendal Guardians	1	Ambleside	1
West Ward Guardians	1	West Ward	1
Public Authorities outside		Kendal	3
Westmorland :		Windermere	2
Bolton Corporation	4	Kirkby Lonsdale	1
Bolton Guardians	2	Heversham and Endmore	1
		East Ward	1
		Burton and Holme	1
		Appleby and Kirkby	1
		Stephen.	

N.B.—Amongst the subscribers to "District Enterprise" funds were the following :—

	£
Ambleside U. D. O.	10
Grasmere U. D. O.	5
Windermere U. D. O.	20
Kirkby Lonsdale U. D. C. ...	10

Other illustrations of support afforded sanatoria are the following, and some of these illustrate, as also does the Winsley Sanatorium already referred to, the manner in which Industrial Co-operative Societies and kindred bodies are supporting beds :—

NOTTINGHAM SANATORIUM (1906).

	Annual Contribution.
	£
Mansfield Corporation... ..	32
Nottingham Corporation	75
Newark Corporation	75
Basford Guardians	20

As also certain "District" funds.

WORCESTER SANATORIUM (1906).

	Annual Contribution.
	£
	Beds.
Worcester Guardians	1 ... 75
Oldbury District Committee	2 ... 150
Redditch District Committee	1 ... 75

DEVON AND CORNWALL SANATORIUM (1906).

	Beds.	Annual Contribution.
		£
Plymouth Corporation	2 ...	150
East Stonehouse Urban District Council	1 ...	75
Truro Rural District Council	1 ...	75
St. Germans Guardians	1 ...	75
Plymouth Guardians	2 ...	150
Devonport Guardians	1 ...	75
St. Austell Guardians	2 ...	150
St. Thomas Guardians	1 ...	75

LEEDS SANATORIUM (1906).

	Beds.	Annual Contribution £
Leeds Corporation	—	2,000
Bramley Guardians	—	100
Hunslet Guardians	2	140
Holbeck Guardians	1	70
Leeds Guardians	2	140
Leeds Industrial Co-operative Society, Limited... ..	—	75
Leeds Workpeople's Hospital Fund ...	—	280

MAITLAND COTTAGE SANATORIUM (1906).

	Beds.
Reading Corporation	2
Metropolitan Borough of Woolwich...	6

MANCHESTER SANATORIUM (DELAMERE) (1906).

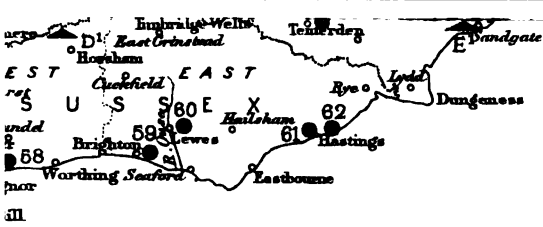
	Beds.	Annual Contribution £
Manchester Corporation	20	1,000

Certain sanatoria for pulmonary tuberculosis are largely self supporting, and in connection with this aspect of the question reference may be made to the detailed descriptions of Kelling Sanatorium in Norfolk, Maltings Farm Sanatorium in Essex and Maitland Cottage Sanatorium in Oxfordshire; while "The Workmen's Sanatorium" at Benenden in Kent, is managed entirely by the working classes for members of their own class. Many of the existing sanatoria have been erected in connection with or have subsequently been linked to, existing institutions, and, as will be shown later, there are advantages in this course.


Instances of such association are: the Northwood Sanatorium which is technically a branch of the Mount Vernon Hospital at Hampstead; the Brompton Sanatorium in Surrey in connection with the Brompton Hospital for Consumption; the Manchester Sanatoria in Delamere Forest and at Bowdon, in connection with the Manchester Out-patient Department; the Liverpool Sanatorium in Delamere Forest in connection with the Liverpool Consumption Hospital; and Armley House near Leeds, in association with the Leeds Sanatorium at Selby.

Illustrative of like association of Sanatoria and Poor Law Institutions are the Liverpool and Bradford Poor Law Sanatoria with the Poor Law Infirmaries of the Liverpool and Bradford Unions respectively.

Finally, it has to be mentioned that in certain districts beds at the Municipal isolation hospital have been allocated to consumptive patients. A separate chapter is, however, devoted to this subject.



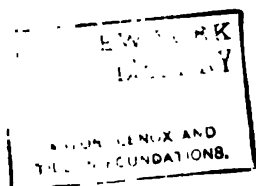
ICE.

Ac., marked thus 

Sanatorium	43	City Road	K	Cotswold
	44	Home for Dying	L	Malden
	45	Royal Sea Bathing Hospital	N	Luttkur
	46	Victoria Home	M	Noradach-on-Mendip
	47	East Cliff House	N	Mendip Hills
	48	Devon and Cornwall	O	Hailey
	49	Western Hospital	P	Kingwood
	50	Mildmay Convalescent Home	Q	Mooroote
	51	National Hospital	R	Dartmoor
	52	Firs Home	S	Udal Torre
hiswick	53	St. Johns Home	T	Dunston Park
	54	Hahnemann Home	U	Alderney Manor
	55	Royal National Hospital	V	Overton Hall
	56	St. Catherine's Home	W	Stourfield
	57	King Edward VII.	X	Home Sanatorium
	58	Ruetington	Y	Noradach in New Forest
Females	59	Brighton Isolation Hospit	Z	Crooksbury
	60	Lewes Isolation Hospita.	A	Whitmead
	61	Eversfield	B	Woodcot
	62	Fairlight	C	Oakley
	63	Benenden	D	Rudgwick
			E	Sandgate

Printed at the Ordnance Survey Office, Southampton in 1907.

establishment of sanatoria.



at the Municipal isolation hospital have been allocated to consumptive patients. A separate chapter is, however, devoted to this subject.

The usual method of admission into public sanatoria, other than to the subsidised beds already referred to, is by a letter of recommendation from a donor or subscriber to the institution, accompanied or not, as the case may be, by a weekly payment from, or on the part of, the patient. The weekly payments for ordinary patients ranges, as will be seen, from about £1 to £2, but in some of the popular sanatoria a few private patients are admitted at a weekly charge of from £2 to £3 (Crossley and Delamere, pp. 348 and 343). In some cases, too, where the charge made to local patients does not quite cover the cost of maintenance, outside patients are admitted at a charge calculated to afford a small profit (Westmorland, p. 490).

The number of beds at the several sanatoria varies greatly, being in the case of the Brompton Hospital over 300, and in some of the more important sanatoria about 100. But, for the most part, the accommodation at the several institutions is considerably below this figure, although, as will be seen from the detailed accounts furnished in Part II. (p. 261), the number of beds is gradually increasing. It is impossible to estimate, even approximately, the number of phthisical persons in England and Wales at the present time, since obviously the usually accepted standard of multiplying the deaths by three, when regard be had to the post-mortem records dealt with in Chapter V., much under-estimates the prevalence of the disease. But during 1906 there were nearly 40,000 deaths registered as due to phthisis, and, on the standard referred to, there are about 120,000 persons suffering from this disease.

It will be seen by the index at the commencement of Part II., in which the counties comprising sanatoria are grouped alphabetically, that, including hospitals for consumption as also sundry other institutions in which beds are allocated for the use of patients, there are now over 90 establishments, 61 public and 30 private, exclusive of infirmaries and workhouses, wherein patients suffering from consumption can be accommodated. The number of institutions and beds is in one or another fashion increasing year by year, although not rapidly, and the beds available at the present time (1907) amount to approximately 3,900. This total is, however, but a portion of the total accommodation available if the provision made by the Poor Law Authorities be included.

The map which is here furnished will convey a general idea of the geographical distribution, in 1907, of institutions for tuberculosis in England and Wales, the "public" sanatoria being indicated by red circles, the "private" by red triangles. It will be of interest to compare this map with that in Part IV., relating to the distribution of similar institutions in the German Empire (in 1905), wherein compulsory insurance against sickness and invalidity has proved such a potent force in promoting the establishment of sanatoria.

CHAPTER X.

STATUTORY POWERS POSSESSED BY LOCAL SANITARY AUTHORITIES, COUNTY COUNCILS, AND BOARDS OF GUARDIANS FOR THE ERECTION OF SANATORIA, FOR THE PURCHASE OF EXISTING INSTITUTIONS, AND FOR CONTRIBUTING UNDER CERTAIN CIRCUMSTANCES TO THE COST OF ERECTING SANATORIA, OR TO THE MAINTENANCE OF PATIENTS THEREIN.

As some ambiguity appears to prevail with respect to the statutory powers which exist for the provision and support of sanatoria in England and Wales, a useful purpose may be served by brief reference to the subject.

As regards Local Sanitary Authorities, such as Borough Councils, or Urban and Rural District Councils, the necessary statutory powers are conferred by the Public Health Act, 1875, section 131 of which provides as follows :—

Any local authority may provide, for the use of the inhabitants of their district, hospitals or temporary places for the reception of the sick, and for that purpose may themselves build such hospitals or places of reception ; or contract for the use of any such hospital or part of a hospital or place of reception ; or enter into any agreement with any person having the management of any hospital for the reception of the sick inhabitants of their district, on payment of such annual or other sum as may be agreed on. Two or more local authorities may combine in providing a common hospital.

It is under the powers conferred by this section that the local authorities referred to in the last chapter such, for instance, as the Manchester, Bristol, Leeds, Nottingham, Plymouth, Bath, Sunderland, Gateshead, Reading and Kendal Corporations are making annual contributions to certain already established sanatoria, and that the Bristol Corporation and the Highworth and Cirencester Rural District Councils, under the additional powers conferred upon local authorities by sections 233 and 234 of the same Act, have borrowed money with the consent of the Local Government Board, wherewith to become part proprietors of the Winsley Sanatorium. Similarly, it is under the same provision that the Birmingham Corporation, acting under the advice of Dr. Robertson, has obtained the sanction of the Local Government Board to borrow £17,000 for the purchase of a sanatorium site near Cheltenham, and that Sheffield, advised by Dr. Scurfield, is converting an existing building into an institution for the education of consumptive persons in a preventive sense, and for the selection of suitable cases for sanatorium treatment. It will be noted that under the powers conferred by section 131 two or more authorities may combine for the provision of a sanatorium.

As regards county councils, the necessary powers are regarded by the Local Government Board as being conferred by the Isolation Hospitals Acts, 1893 and 1901. Under the former enactment a "hospital district" may (upon application by one or

more local authorities, or on a report by the County Medical Officer of Health) be constituted by the county council, and for this district a "hospital committee" may be appointed to provide hospital accommodation, &c., for "patients suffering from infectious diseases."

As a general rule the hospitals hitherto provided under these powers have been for the isolation of one or more of the acute infectious diseases specified under the Infectious Disease (Notification) Act, 1889. But under section 26 of the Isolation Hospitals Act, 1893, the term "infectious disease" may be applied by the county council with the consent of the Local Government Board to diseases other than those contained in the Infectious Disease (Notification) Act, 1889.

It is, therefore, necessary for a county council desirous of erecting a sanatorium for pulmonary tuberculosis to constitute a "hospital district" under the Isolation Hospitals Act of 1893, for the specific purpose of providing hospital accommodation for cases of that disease, and with the consent of the Local Government Board, to make an Order under section 26* of that Act, applying the expression "infectious disease" to pulmonary tuberculosis strictly and exclusively, for the purpose of that Act, i.e., for hospital accommodation only.

Under section 3† of the Isolation Hospitals Act, 1901, it is competent for the hospital committee to enter into an agreement with local authorities for the isolation of persons suffering from pulmonary tuberculosis, and for the county council, under sections 21‡ and 22 of the Isolation Hospitals Act, 1893, to

* The expression "infectious diseases" in this Act has the same meaning as in the Infectious Diseases (Notification) Act, 1889, and the provisions of this Act shall apply to the infectious diseases specifically mentioned in that Act, and may be applied to any other infectious disease by order of the County Council, or any committee to whom they have delegated their powers under this section, in like manner as if such council or committee were a local authority acting under that Act.

† (1) The hospital committee of any hospital district under the principal Act may make and give effect to agreements for the use of any hospital or part of a hospital, or for the reception into any hospital of the sick of their district, upon payment of such annual or other sums as may be agreed upon.

(2) Any expenses incurred by a hospital committee under this section shall be defrayed under the principal Act as structural, establishment, or patients' expenses, in such proportion as the committee direct.

‡ (21) A county council may, where they deem it expedient so to do for the benefit of the county, contribute out of the county rates a capital or annual sum towards the structural and the establishment expenses of an isolation hospital, or to either class of such expenses.

(22) A county council may borrow on the security of the county rates, and in manner provided by the Local Government Act, 1888, any money required for the purpose of carrying into effect the provisions of this Act; and any loans so borrowed, and any other money expended by them for the purposes of this Act, together with interest thereon at the rate of four pounds per centum per annum [rate of interest is repealed by Act of 1901], shall be repaid to the county council out of the local rates as in this Act directed; and in the case of a loan should be repaid within a period not exceeding that within which the loan is repayable by the county council.

contribute to the expenses of such accommodation. It is, moreover, provided by section 2 of the *Isolation Hospitals Act*, 1901, that power to contribute to an isolation hospital (*i.e.*, a sanatorium), includes the power to contribute in the manner provided by section 21 of the Act of 1893 to any hospital provided by a local authority (including a joint board), within the meaning of the *Public Health Act*, 1875, for the reception of persons suffering from infectious disease, whether within the area of the county council or not, but the consent of the Local Government Board is required to such an annual contribution to a hospital which has been provided or enlarged otherwise than out of funds provided from borrowed money.

County councils, subject to the foregoing limitations, have therefore the power to erect or to purchase sanatoria, to contribute to the maintenance of patients in such institutions and, within the limits prescribed by section 2 of the Act of 1893, the power to compulsorily combine sanitary authorities for the purpose of providing sanatoria.

Hitherto, county councils have not made use of the foregoing powers to any material extent, and this may in some measure be due to the misconception and apprehension which has existed with reference to the consequences of declaring pulmonary tuberculosis an "infectious disease," for the purpose of the *Isolation Hospitals Act*, throughout an entire county. It has been feared that such a declaration might be fraught with disastrous consequences to consumptive patients and, indeed, to the public generally, who would be regarded as social lepers and arrested under section 126 of the *Public Health Act*, 1875, immediately they showed themselves outside their houses in the same fashion as would be the case were they suffering from small-pox or typhus fever. It has been anticipated, too, that a county council having provided accommodation for patients, and having "isolated" them in sanatoria, might be legally bound to retain such patients until they were cured or until they died.

It has, to the knowledge of the writer, been seriously questioned in one instance whether a county council might not render itself liable to legal proceedings for discharging from its sanatorium a consumptive patient who had not been completely "cured"; and representation made that consequently it might be necessary to retain patients for very many years, seeing that the practicability of absolute "cure" in the literal sense is seriously questioned by some authorities.

It is true that the order contemplated under section 26 of the *Isolation Hospitals Act*, 1893, applies the expression "infectious disease" to pulmonary tuberculosis, but the important distinction has to be borne in mind that the addition of this malady to the list of the notifiable diseases *for the purpose of the Isolation Hospitals Acts* does not in itself constitute the disease an "infectious" malady in any sense whatever.

A person suffering from pulmonary tuberculosis is not by virtue of this addition rendered amenable to any of the disabilities under the Public Health Act, 1875, or other measures relating to infectious diseases, nor is the disease by reason of such addition constituted a *notifiable* disease. A consumptive person is thereby subjected to no limitation of his movements and to no disqualifications, the only difference being that such person may, by virtue of the "order" here in question, have access to a sanatorium, assuming, of course, that the "order" has been followed by the provision of such an institution. The application of the term "infectious disease" to pulmonary tuberculosis must, indeed, in this sense be regarded rather as a legal technicality necessary to satisfy the terms of the statute than as a scientific declaration.

The only county councils which have so far (1906) added pulmonary tuberculosis to the list of "infectious diseases" in the sense here understood are the county councils of Devonshire and Cheshire, but provision of a sanatorium out of the county funds has not as yet been made in consequence of such declarations, although some such provision is, I believe, in contemplation in the county of Cheshire.

As regards the powers of Boards of Guardians relative to the provision of sanatoria and the assistance of paupers suffering from pulmonary tuberculosis, the Guardians are empowered to provide "workhouses" including buildings for the treatment of the sick poor, and consequently of paupers suffering from tuberculosis. Moreover, section 10 of the Poor Law Act, 1879, extends the provision of section 4 of the Poor Law Amendment Act, 1851, in such fashion as to

"Authorise the Guardians with such consent as is therein* mentioned to subscribe towards any asylum or institute for blind persons or for deaf or dumb persons suffering from any permanent or natural infirmity, or towards any association or society for aiding such persons, or for providing nurses, or for aiding girls or boys in service or towards any other asylum or institution which appears to the guardians, with such consent as aforesaid, to be calculated to render useful aid to the administration of the relief of the poor. Provided always that nothing herein contained shall authorise any subscription to any asylum or institution unless the Local Government Board is satisfied that the paupers under the guardians have, or could have, assistance therein in case of necessity."

* "The 14 and 15 Vict., c. 106, s. 4, provides that whereas doubts have been entertained with regard to the legal authority of guardians to subscribe towards the funds of any hospital or infirmary. Be it enacted that the guardians of any union or parish may, with the consent of the Local Government Board, pay out of the common fund of such union, in the case of a parish out of the funds in the hands of such guardians, any sum of money as an annual subscription towards the support and maintenance of any public hospital or infirmary for the reception of sick, diseased, disabled or wounded persons, or of persons suffering from any permanent or natural infirmity."

It is under the foregoing provisions that several Boards of Guardians in the country are sending tuberculous paupers to sanatoria.

It may also be pointed out that, in addition to the powers conferred by the foregoing provisions, Boards of Guardians are enabled to combine under the provisions of section 8 of the Poor Law Act, 1879, which enacts that

When, on any representation, it appears to the Local Government Board that the combination of two or more unions not in the Metropolis for any purpose connected with the administration of the relief of the poor would tend to diminish expense, or would otherwise be of public or local advantage the Board may, with the consent of the guardians of the unions to be combined, make an order for combining such unions for the purposes named therein, and for constituting for the execution of such purposes a joint committee of the guardians of each of the combined unions.

By virtue of the powers conferred by this section the three Boards of Guardians of the City of Liverpool have been combined for the purpose of erecting the Heswall Sanatorium on the banks of the Dee.

CHAPTER XI.

GENERAL CONSIDERATIONS AS REGARDS STATISTICS
RELATIVE TO PATIENTS TREATED IN SANATORIA.

The proposition that whereas one physician experienced in the clinical manifestations of pulmonary tuberculosis could fill a sanatorium with patients all of whom would recover, while another physician, equally experienced, could fill a similar institution with patients all of whom would die, carries with it a germ of truth which may well be borne in mind throughout this chapter.

It is possible to imagine on the one hand a sanatorium filled with patients who have been selected on the basis of reacting to the tuberculin test,* and on the other hand a sanatorium recruited from the infirmary of an average workhouse. Or, again, to contrast a sanatorium into which none but cases of confirmed pulmonary tuberculosis are admitted with one which accepts only patients in the quite early stages of the disease, or even before the nature of the disease has been definitely determined.

Thus, different methods of selecting patients in the sanatoria of England and Wales and the varying nomenclature adopted are liable to render fallacious comparisons between the results of different institutions. In some instances, as has been said, the Poor Law is the avenue through which the sanatoria are furnished with patients, and this is the case with the Liverpool and Bradford Poor Law Sanatoria at Heswall and Skipton respectively. In other institutions such, for instance, as the Brompton, Northwood, and Leeds sanatoria the cases have, at least in many instances, been observed in a hospital

* The influence which the inclusion of cases, where the only evidence of tuberculosis is reaction to the tuberculin test, may exercise upon the sanatorium statistics is perhaps in some measure indicated (although the numbers are of course too small for basis of substantial inference) by the subjoined table taken from the Brompton Medical Report for the year 1905.

"Cases with no signs of disease on admission but presenting a positive reaction to the tuberculin test.—In these cases the symptoms suggested pulmonary tuberculosis, while there was no evidence of the presence of tuberculous lesions elsewhere in the body."

—		Total.	Per-centage.	Average length of stay in weeks.	Average change of weight in lbs.	Average change per week in lbs.
Males	Much improved	1	38.3	10.6	+ 14.0	+ 1.34
	Improved ...	2	66.6	13.6	+ 10.6	+ .87
Females	Much improved	2	100.0	10.6	+ 12.25	+ 1.22

before being drafted to the sanatorium. Observations in this sense may mean in practice that only such cases are sent to the sanatoria which have actually shown while in the hospitals associated with such sanatoria some favourable reaction.

Perhaps the best documentary evidence indicating the importance of this selection is to be derived from the Medical Report for 1905 relating to the hospital for consumption at Brompton, with a copy of which Dr. Theodore Williams, M.V.O. (one of the consulting physicians) has been good enough to furnish me.

Cases selected for sanatorium treatment.

Of the 1,093 cases treated in the Brompton hospital for pulmonary tuberculosis, 191, 163 men and 28 women, were selected for further open-air treatment at the Brompton Hospital Sanatorium which was opened to receive patients on March 8th, 1905. Of these patients, 16 men and 3 women had been less than three weeks in the hospital. The 191 cases comprised:—

	163 Men.		28 Women.	
	Number.	Percentage.	Number.	Percentage.
Ordinary cases	187	84.05	25	89.3
Acute cases	25	15.34	3	10.7
Casualty cases	1	.61	—	—

They presented the following distribution when classified according to the extent of pulmonary lesions on admission to the Brompton hospital.

Number of lobes giving physical signs on admission.		0.	1.	2.	3.	4.	5.
Men ...	{ Number	2	57	57	84	18	—
	{ Percentage	1.2	84.9	84.9	20.8	8.0	—
Women	{ Number	—	11	18	4	—	—
	{ Percentage	—	39.28	46.48	14.29	—	—

The progress made by these patients during their stay in the Brompton hospital is recorded below.

	Much improved.	Improved.	In statu quo.	Not so well.
Men	68	92	2	1
Women	11	18	1	—

It will be seen, therefore, that practically all the patients had "much improved" or "improved" before being sent to the sanatorium; and the significance of this fact cannot well be exaggerated.

Again, it is the practice at some sanatoria abroad to take in patients on approval, and if such patients do not react favourably within a certain time to discharge them from the sanatorium. The fact of their discharge may be mentioned in the annual report, but the percentages of "arrests" &c. are not always calculated on a basis which embraces the patients so discharged.

In one instance, Maitland Cottage Sanatorium, certain cases are sent in by a county borough for purposes of educating phthisis patients in self-management of their malady, and out of the number thus admitted a few cases are selected by the Medical Director for treatment in the hope of promoting arrest of the disease.

Another quite recent adaptation of the same principle has been made in the case of the Worcester Sanatorium. In this institution the cases are divided according to their lung condition into those in whom "permanent benefit could be expected," "more severe cases," and "advanced cases admitted on probation." With regard to the "more severe cases," Dr. J. H. Greensill, the Medical Superintendent, states in his annual report for 1905 :—

In these cases it is impossible without prolonged observation to give any definite forecast as to the probability of their reacting to sanatorium treatment, and it is for such patients that this arrangement has been made with the Worcester Infirmary by which cases are admitted to that institution for preliminary treatment and observation before coming to Knightwick. Even extensive disease in the lungs does not preclude the possibility of prolonged working capacity, and if, while in the infirmary, it is found that there is a probability of the disease being limited, these cases are, after a few weeks' observation, transferred to Knightwick.

On the other hand, cases in which the disease is not only extensive but found to be acute and advancing, are refused admission to the sanatorium. If more cases of this kind can be sent to the Infirmary in future, it is probable that greater success will be obtained, and such acute and hopeless cases as are included in Table III. will but seldom be admitted to the sanatorium.

A somewhat similar idea is conveyed in the following extract from the annual report for 1905 on the Sherwood Forest (Nottingham) Sanatorium :—

"The necessity of the early recognition and treatment of phthisis must be again insisted on, and a further lesson of our enquiries pointed out that those cases do best which before admission into the sanatorium have for a time been under observation in the general hospital. As was said in last year's report, there is a small proportion of acute cases which will not respond to any treatment, however early, and it is only by careful preliminary observation for a few weeks that these cases can be eliminated.

"It is impossible for a doctor at a single interview to certify that a given patient will give a satisfactory response to sanatorium treatment. Such preliminary observation can best be carried out in the wards of a

hospital, where proper treatment can also be commenced and the loss of valuable time avoided. Moreover, this preliminary hospital treatment has the further advantage that some cases which at first sight seem unsuitable for the sanatorium, show unexpected recuperative power, and are afterwards transferred there with benefit. It may be laid down as a general rule that a sanatorium for the poor is best worked in connection with an urban hospital."

The above extracts have been quoted in order to indicate the tendency which undoubtedly exists in connection with sanatoria of providing some more efficacious method of selecting suitable cases than that at present in vogue.

Although, as has been shown above, certain sanatoria obtain at least some of their cases through hospitals for consumption, or other analogous institutions, it is, unfortunately, true that the majority of patients who are sent into sanatoria reach them through somewhat miscellaneous, more or less philanthropic channels; that is to say, the patients are introduced largely through the influence of the subscribers who support the several institutions in question. With a view to securing only early cases, medical referees are sometimes appointed in different parts of the district from which a sanatorium draws its cases, and by this means a certain number of undesirable patients are rejected.

Notwithstanding these safeguards, a very large proportion of the patients finding their way into sanatoria are not well suited for sanatorium treatment. Hence, as will be seen by the detailed accounts of the several institutions which follow, reports of "first year's" operations almost without exception expressed regret that fewer earlier cases did not apply for admission; which regret has been repeated in most instances by subsequent reports. In one report, indeed, there are indications that the quality of the cases sent into that sanatorium is deteriorating.

To such extent is this the case in certain sanatoria that there is a tendency to devote some of the beds to "educational" purposes rather than to fill them with hopeless cases.

For instance, in his annual report for 1905 upon the Devon and Cornwall Sanatorium, Dr. Julian C. Fleming, the Medical Superintendent, observes:—

"As there is so much difficulty in obtaining early and curable cases, I would suggest the advisability of putting aside a number of beds for purely educational purposes, as has been done with success for some years at Brighton. In these beds the patients would be kept for one month only, during which time they would be taught how to live, and how to avoid the risk of infecting others. In this way a much larger number of patients would be able to pass through a course of instruction during the year, and the gain to the health of the community would be very great. It is hoped that in course of time the importance of early treatment will be more clearly understood, and then it may be possible to get more cases which have not passed beyond the curable stage."

This suggestion was acted upon during the year 1905-6, ten patients being admitted for a course of one month's duration.

Again, in the Cumberland report for 1905, the following passage is found :—

"The Committee not having been able to fill the beds in the sanatorium with the more promising type of patients, have been obliged, as at first, to admit more or less advanced cases, with the consequence that the sanatorium statistics are made to appear not very favourable. The Committee, however, are encouraged by the results of the work as a whole, curative and educative, and while referring the Subscribers to the appended tables, beg to quote a few individual instances."

But not only have differences in the method of selection to be borne in mind but, as will be seen later, differences of nomenclature employed in the grouping of cases on admission are such as to enhance the difficulties of comparison. The following examples of the classification on admission will serve to illustrate this point :—

Durham.	Kelling.	Hull.
Consolidation (or early) cases.	Febrile cases ... { Advanced. Slight.	Early.
Cavity (or advanced) cases.	Non-febrile cases { Long-standing. Recent.	Moderately advanced. Advanced.

Nottingham.	Maitland Cottage.	Worcester.
Early.	Early.	Early.
Serious.	Moderate.	More advanced.
Advanced.	Advanced.	Very bad.

Mount Vernon.	Westmorland.	Cumberland.
Early	Slight.	Slight.
Chronic.	Moderate.	More extensive.
Cavitation.	Advanced.	Seriously complicated.
	Seriously complicated.	

There would, however, appear to be an increasing tendency to adopt Turban's* grouping or some modifications thereof.

* The diagnosis of tuberculosis of the lungs, with special reference to the early stages by Dr. K. Turban, Privy Councillor: Director of the Sanatorium at Davos, with an introduction by Sir Dyce Duckworth, M.D., LL.D., F.R.C.P. Translated by Egbert O. Morland, M.B., B.Sc. John Bale, Sons & Danielsson, Ltd. London, 1905.

Turban's classification is as follows :—

Stage I.—Disease of slight severity affecting at most one lobe or two half lobes.

Stage II.—Disease of slight severity more extensive than Stage I. but affecting at most two lobes, or severe and affecting at most one lobe.

Stage III.—All cases of greater extent and severity than Stage II.

By the term "slight severity" is implied disseminated foci manifested clinically by slight impairment of resonance, cough, or weak breathing, either vesicular, vesico-bronchial, or broncho-vesicular with fine and medium *râles*. By "severe" disease; compact consolidation and cavities; recognised by great impairment of resonance, tympanitic note, very weak broncho-vesicular, bronchial or amphoric breathing with musical or toneless *râles* either medium or coarse. Simple pleuritic dulness if only a few centimetres in extent is to be neglected; if it be considerable, it should be specially named among the complications. The extent of "one lobe" is always to be taken as equivalent to that of "two half lobes," and so on.

Such grouping has been adopted by some of the largest and most important institutions in the country, such, for instance, as the Manchester (Crossley) Sanatorium, the Liverpool (Delamere) Sanatorium, and others, while what may be termed for descriptive purposes modifications of such grouping have been adopted (sometimes in addition to other methods of grouping) at the Brompton Sanatorium, the Devon and Cornwall Sanatorium, and at Mount Vernon Sanatorium.

It should, however, be pointed out that classification according to the number of lobes affected has been practised at the Brompton Hospital for very many years.

Dr. Bardswell informs me that the classification furnished below* has recently been adopted at King Edward VII. Sanatorium :—

* *Copy.*

GROUP 1.—*Patients with early disease.*

Definition.—Patients with early and limited disease affecting one or two lobes in one or both lungs. Constitutional symptoms, *e.g.*, fever, &c., slight or absent.

GROUP 2.—*Patients with advanced disease.*

Definition.—Patients with advanced disease, *viz.*, with infiltration and consolidation of two or more lobes with or without excavation, associated with the usual symptoms of active tuberculosis, *e.g.*, fever, &c.

GROUP 3.—*Patients with very advanced disease.*

Definition.—Patients with very extensive disease of considerable (for a year or more) duration, with considerable lung consolidation and excavation associated with some permanent damage to the general constitution, as evidenced by impaired digestion, weakened and muscular and vascular tone, &c.

A detailed description of the clinical condition of the patients included in each group is given in the tables; this compensates to a considerable extent for the imperfections which are inseparable from the adoption of any system of classification.

In certain instances, at Leeds and Heswall Sanatoria for example, all the cases have hitherto been grouped together in so far as the annual report is concerned.

There is, too, some want of uniformity in the terms used by different sanatoria to denote the state of health of the patients on discharge. In some cases the most satisfactory result is denoted by the word "cured," and this is the case at the Crossley and the Devon and Cornwall Sanatoria. At other institutions the most satisfactory result attained is denoted by the term "practically cured" (Leeds), "apparently cured" (Durham), "provisionally cured" (Bradford). In other sanatoria the greatest gain is expressed by the term "arrested" (Nottingham, Worcester, Winsley). But it may be noted that there is a general tendency to discontinue the use of the word "cured" and to substitute for it the word "arrested."

In other instances (Northwood and Liverpool) "much improved" or "great improvement" expresses the greatest progress made, and it will be seen that in the case of the Hull and East Riding Sanatorium, although the term "arrested" was employed in relation to the patients discharged during the first year (1902) in which the sanatorium was in operation its use was discontinued subsequently, the term "very much improved" being thus employed in 1903 and 1904, and "much improved" during 1905.

Somewhat similar comment applies to the terms used with reference to the working capacity of the patients on discharge from a sanatorium.

It would be useful if some definite statements were recorded as to the ability or inability of the patient to perform work on admission to the sanatorium. Obviously, there are patients who on admission are able to perform "light work" or "suitable work," and as both these terms are employed with reference to discharged patients it would enhance the value of the statistics if their abilities or disabilities in this sense were recorded on admission.

The following terms are used to describe the conditions of the patients on discharge from King Edward VII. Sanatorium :—

ARREST	...	...	General health restored in every respect. Lung disease completely arrested ; there being no physical signs present, or only such as are compatible with a completely healed lesion. No cough ; no expectoration, or if found, free of tubercle bacilli.
MUCH IMPROVED	...	...	General health completely restored. Physical signs in the lung, though much improved, not completely cleared up, <i>e.g.</i> , perhaps limited to a few moist sounds on cough only.
IMPROVED	...	...	General health, though improved, only imperfectly restored. Physical signs though less marked than on admission, still present.
STATIONARY...	...	...	No appreciable improvement in physical signs or in general health.
WORSE	...	...	Deterioration of general or local condition or of both.

The use of the term "fit for work" would seem to call for better definition if the statistics relative to sanatoria are to possess the highest economical value. This term used alone does not indicate whether the patient is able to follow his old employment, or whether it is only some lighter or less remunerative occupation that is in question. In this connection there is the difficulty of defining, in the absence of any test at the sanatorium, the precise working powers of the discharged subject. Moreover, it must be borne in mind that many patients were engaged in their ordinary vocations up to within a few days of admission, and the earlier the disease is recognised the more does this criticism apply.

In institutions where the patients are put through a graduated course of employment, such, for example, as at the Brompton, Northwood, Kelling, and Crossley sanatoria, there should be no difficulty in expressing the working capacity, but in other places where the advanced character of the cases or other reasons render the employment of the patient undesirable, detailed classification according to working capacity is a much more difficult task.

The Germans in making use of the term "recovery of working power" imply not necessarily a recovery of complete working capacity, but only a recovery of one-third of the patient's normal working capacity. This is a fact of importance to be borne in mind in comparing the statistics of English sanatoria with those of the German institutions.

Enough has perhaps been said to show that the difficulties connected with the attempt to compare the statistics of the several sanatoria are not inconsiderable; indeed, that it is doubtful whether at the present time such comparisons might not prove positively misleading.

In the circumstances it has been judged preferable simply to set out the figures for the several sanatoria, making no attempt to draw comparisons. The tables which now follow deal with the immediate results on discharge of all cases grouped together, and they make no distinction between early and advanced cases, a differentiation which is reserved for the next chapter. The terms used are those employed in the annual reports of the several sanatoria under consideration. In order however to bring the tables within convenient limits, the following terms have been grouped into the same column: "cured," "practically cured," "provisionally cured," "relatively cured."

Similarly the terms "very greatly improved," "very much improved," or "much improved," have been regarded as convertible.

"Slight improvement," "no improvement," or "stationary" are combined in a single column, as also are the terms "worse" or "unsuitable."

CHAPTER XII.

IMMEDIATE RESULTS OF SANATORIUM TREATMENT.

In the first table some of the institutions to which the most satisfactory results are chronicled as "cured" either unconditionally or conditionally are dealt with; in the second table statistics are furnished for some of the institutions in which the term "cured" is not employed, but in which the greatest progress is spoken of as "arrested," "very much improved," "very greatly improved," or "much improved"; in the third table are to be found a few data relative to the fitness for work of the patients on discharge. In the latter table I have endeavoured to leave a column for each term used, as the terms "fit for work," "fit for light work," and "fit for suitable work" have probably each a special significance.

N.B.—The statistics contained in the reports of the Westmorland Sanatorium do not easily lend themselves to grouping in the above sense; but *see* chapter as to "lasting effects of sanatorium treatment."

Table relative to Sanatoria in connection with which the term "cured" is the most favourable term employed as regards condition on discharge.

Sanatorium.	Year.	Total.	Cured, absolutely, provisionally, or relatively.	Very good, very much, much, or great improvement.	Improved.	Slight or no improvement, or stationary.	Worse or unsuitable.	Doubtful.	Left for sundry reasons.	Died.
Durham ..	1900-1	36	0	14	13	—	—	—	—	—
	1901-2	55	13	29	12	—	1	—	—	—
	1902-3	79	14	46	12	—	7	—	—	—
	1903-4	98	16	66	10	6	—	—	—	—
	1904-5	112	19	78	11	—	4	—	—	—
	1905-6	141	21	91	14	—	14	—	—	1
	1906-7	153	24	92	23	—	12	—	—	2
	Totals	674	116	416	66	6	38	—	—	3
Percentage ..			17.2	61.7	14.1	9	5.6	—	—	5
			78.9							

Sanatorium.	Year.	Total.	Cured, absolutely, provisionally, or relatively.	Very good, very much, much, or great improvement.	Improved.	Slight or no improvement, or stationary.	Worse or unsuitable.	Doubtful.	Left for sundry reasons.	Died.
Leeds ..	1901	27	14	10	—	3	—	—	—	—
	1902	59	21	24	—	14	—	—	—	—
	1903	91	35	40	—	16	—	—	—	—
	1904	101	38	48	—	17	—	—	—	—
	1905	83	40	35	—	7	—	—	—	—
	1906	135	55	52	—	28	—	—	—	—
	Totals	495	201	209	—	85	—	—	—	—
	Percentage ..		40·6	42·2	—	17·2	—	—	—	—
			82·8							
Bowdon ..	1903	188	16	88	51	56	24	—	—	3
	1904	222	13	35	58	56	23	36	—	1
	1905	281	9	43	92	60	16	40	—	1
	1906	204	14	63	56	51	19	—	—	1
	Totals	875	52	179	257	223	82	76	—	6
	Percentage ..		5·9	20·5	29·4	25·5	9·4	8·7	—	·7
			26·4							
Devon and Cornwall.	1903-4	47	39	—	8	—	—	—	7	3
	1904-5	49	36	12	6	2	—	—	3	—
	1905-6	57	35	8	10	3	—	—	—	1
	1906-7	80	32	4	30	—	12	—	1	1
	Totals	233	122	24	54	5	12	—	11	5
	Percentage ..		52·4	10·3	23·2	2·1	5·2	—	4·7	2·1
			62·7							
Bradford (Poor Law)	1903-5	53	11	18	14	9	—	—	—	1
	1905-6	39	18	10	—	11	—	—	—	—
	Totals	92	29	28	14	20	—	—	—	1
	Percentage ..		31·5	30·4	15·2	21·7	—	—	—	1·1
			61·9							
Manchester (Grossley)	1905	171	25	38	47	51	2	6	—	—
	1906	110	19	19	28	39	4	—	—	1
	Totals	281	44	57	75	90	6	6	—	3
	Percentage ..		15·6	20·3	26·7	32	2·1	2·1	—	1·1
			35·9							

Table relative to Sanatoria in connection with which the terms "Arrested" or "Very much improved" are the most favourable terms employed as regards the condition on discharge.

	Year.	Total.	Arrested.	Very much much- or great im- provement.	Distinct improve- ment, or im- provement.	Flight or no im- provement, or stationary.	Worse or unsuit- able.	Left.	Died.
Mount Vernon ..	1901	448	—	103	206	112	22	—	5
	1902	460	—	172	134	128	23	—	3
	1903	490	—	203	133	135	16	—	12
	1904	500	—	212	121	125	18	—	24
	1905	461	—	176	180	71	12	—	22
	1906	675	—	180	213	218	31	—	21
	Totals..	3,043	—	1,065	967	780	122	—	90
	Percentages ..		—	34.7	31.4	25.6	4	—	3
Nottingham .. (Sherwood Forest.)	1902	41	5	12	18	2	4	—	—
	1903	69	17	19	19	4	10	—	—
	1904	80	21	27	19	9	4	—	—
	1905	95	23	36	24	7	5	—	—
	1906	102	27	34	29	7	5	—	—
	Totals..	387	95	128	109	29	28	—	—
	Percentages ..		24	33.1	28.2	7.5	7.2	—	—
			57.1						
Liverpool .. (Delamere Forest.)	1902	125	—	74	33	17	—	—	1
	1903	110	—	72	19	18	—	—	1
	1904	135	—	96	23	14	—	—	2
	1905	141	—	86	30	15	—	—	1
	1906	131	—	87	25	19	—	—	—
	Totals..	642	—	415	139	83	—	—	5
	Percentages ..		—	64.6	21.7	13.0	—	—	.8
Hall and East Riding	1903	36	18	—	12	3	3	—	—
	1904	35	14	—	5	10	2	1	3
	1905	44	22	—	11	8	—	2	1
	1906	36	—	13	10	13	—	—	—
	Totals..	151	34	13	38	34	5	3	4
	Percentages ..		35.8	8.6	25.2	22.5	3.3	2	2.6
			44.4						

	Year.	Total.	Arrest or Recovery.	Very much much, or great improvement.	Distinct improvement, or improvement.	Slight, or no improvement, or stationary.	Worse, or unsuitable.	Left.	Died.
Liverpool Guardians (Heswall.)	1903	35	13	2	12	8	—	—	—
	1904	58	13	2	30	12	—	1	—
	1905	118	10	11	19	8	—	—	—
	1906	58	46	—	6	6	—	—	—
	Totals..	169	82	15	67	34	—	1	—
	Percentages ..		48'2	7'5	33'7	17'1	—	5	—
			48'7						
Daneswood	1904	74	15	29	19	6	2	—	3
	1905	66	33	16	12	4	1	—	—
	1906	73	34	15	17	3	4	—	—
	Totals..	213	82	60	48	13	7	—	3
	Percentages ..		38'5	28'1	22'5	6'1	3'3	—	1'4
			66'7						
Northwood	1905	439	—	215	189	27	3	—	5
	1906	419	—	181	183	49	6	—	1
	Totals..	858	—	396	372	76	9	—	6
	Percentages ..		—	46'2	43'4	8'7	1'0	—	0'7
Winsley	1905	131	49	33	30	17	—	—	2
	1906	196	41	82	47	24	—	—	1
	Totals..	326	90	115	77	41	—	—	3
	Percentages ..		27'6	35'3	23'6	12'6	—	—	0'9
			63'9						

* 1 returned as "cured."

† 7 returned as "cured."

Sanatoria in connection with which results are arranged on discharge on a basis of working capacity.

Sanatoria.	Year.	Total.	Fit for Work.	Fit for suitable Work.	Fit for light Work.	Much improved.	Improved.	Retrospective, marked, or no improvement.	Died of Phthisis.	Died of other Disease.	Re-admitted.	Not heard from.
Kelling ..	1903	54	36	—	13	—	7	9	—	—	—	—
	1904	138	51	—	51	—	17	17	—	—	—	—
	1905	150	57	—	35	—	35	23	—	—	—	—
	1906	162	59	—	55	—	25	23	—	—	—	—
	Totals	502	193	—	153	—	84	72	—	—	—	—
	Percentages		38·4	—	30·5	—	16·7	14·3	—	—	—	—
Winsley ..	1905	131	—	49	—	33	30	17	2	—	—	—
	1906	195	—	41	—	82	47	24	1	—	—	—
	Totals	326	—	90	—	115	77	41	3	—	—	—
	Percentages		—	27·6	—	35·3	23·6	12·5	·9	—	—	—

Notes on Patients treated under the auspices of the Charity Organisation Society.

Colonel Montefiore has kindly furnished me with some valuable data relative to cases of phthisis treated at various sanatoria under the auspices of the Charity Organisation Society, and he was good enough, at my suggestion, so to collect and arrange the data that the after-results for each year might be stated separately. These after-results are discussed later. Here only the immediate results are dealt with.

It has to be noted that the 162 patients to which the table now to be given relates are the completed cases of 190 patients selected out of a total 656 applicants for admission to sanatoria from July, 1902, to the end of October, 1906, *i.e.*, they represent a carefully selected minority of the total number applying. The patients referred to have been sent to one or other of the following sanatoria :—

Kelling, Norfolk.

Clare, Suffolk.

Maltings Farm, Suffolk.

Mundesley Cottage, Norfolk.

Maitland Cottage, Oxon.

Table showing year by year the immediate results on discharge.

Year.	Total Treated.	Well, Working, or Fit for Work.	Improved or Fit for Light Work.	Unimproved or Relapsed.	Dead.	Still in Sanatorium.
1902	7	4	2	1	—	—
1903	33	7	18	6	2	—
1904	54	21	15	14	—	4
1905	45	21	10	8	1	5
1906	23*	13	4	4	2	—
Totals...	162	66	49	33	5	9

* Cases discharged prior to October 1st, 1906.

CHAPTER XIII.

DIFFERENCE AS REGARDS IMMEDIATE RESULTS BETWEEN
"EARLY" AND "ADVANCED" CASES.

The foregoing tables referred to all cases considered together whether "early" or "advanced," "consolidation" or "cavity" cases, and irrespective of how much of one or of both lungs was involved. Similarly, no regard has been taken in such tables of the previous duration of the disease, the presence or absence of complications, or the "suitability" of the cases.

But notwithstanding this absence of differentiation the tables are of considerable value since they show what in actual experience has been found practicable as regards *immediate* results in this country at the present time. They indicate, too, what should be found practicable in the future unless some very material modification of the method of selecting patients is adopted. In order however to convey some idea of what a material improvement in the immediate results might be attained were it possible to secure a larger relative number of "early" and "suitable" cases, or, in other words, to close the doors of sanatoria against all "unsuitable" cases, additional tables are herewith furnished in which the results on discharge are dealt with in relation to the stage of the disease on admission.

Unfortunately, in dealing with the several reports the difficulty as to nomenclature has again to be encountered. Attempts have, however, been made to render the figures with regard to certain of the sanatoria more or less comparable by adopting some slight grouping of the terms. For instance, for purposes of tabular convenience the terms "cured" and "arrested," as also the terms "relatively cured," "very greatly improved," "very much improved," and "much improved," have been coupled together. Similarly, there have been placed in one column the terms "slightly improved," "unimproved," or "stationary," and in another the terms "worse" or "unsuitable."

If objection is taken to any of these groupings data for any other groupings will be found available on reference to the detailed reports relative to each of the sanatoria.

Association of the terms "slightly improved" and "stationary," has been rendered unavoidable as in some of the tables, certain cases are grouped together under "slight or no improvement," and in such cases means were not available for the differentiation of the "slightly improved" from the "unimproved."

In the following tables the gross figures, not the percentages, have been given, since some of the figures being so small any percentage calculation based upon them would be of no value.

But the tables illustrate clearly the important fact which has been demonstrated for many years at Brompton and elsewhere, viz., that the degree of improvement depends very largely upon the stage of the disease—the earlier the disease and the less the lung substance involved the better the immediate results.

Table showing condition on discharge in relation to stage of disease on admission.

Sanatorium and Year.	Stage of disease on admission.	Total.	Arrested.	Much improved.	Improved.	Slight improvement, unimproved, or stationary.	Worse or unsuitable.	Left.	Died.
Nottingham.									
1902	Early ..	11	3	4	3	1	—	—	—
	Serious ..	21	2	7	9	1	2	—	—
	Advanced ..	9	—	1	6	—	2	—	—
1903	Early ..	26	14	7	3	—	2	—	—
	Serious ..	53	3	11	10	2	7	—	—
	Advanced ..	10	—	1	6	2	1	—	—
1904	Early ..	36	19	14	1	1	1	—	—
	Serious ..	36	2	13	13	5	3	—	—
	Advanced ..	7	—	—	4	3	—	—	—
1905	Early ..	39	20	10	6	3	—	—	—
	Serious ..	46	3	24	14	3	2	—	—
	Advanced ..	10	—	2	4	1	3	—	—
1906	Early ..	44	27	13	3	1	—	—	—
	Serious ..	55	—	21	24	6	4	—	—
	Advanced ..	3	—	—	2	—	1	—	—
Worcester.									
1903	Early ..	19	18	—	1	—	—	—	—
	More advanced ..	11	—	—	11	—	—	—	—
	Very bad ..	6	—	—	1	2	3	—	—
1904	Early ..	16	14	—	—	—	—	1	1
	More advanced ..	12	—	4	4	2	—	—	2
	Very bad ..	7	—	—	1	4	2	—	—
1905	Early ..	31	18	1	1	—	—	1	—
	More advanced ..	17	4	—	8	3	—	1	1?
	Very bad ..	6	—	—	2	4	—	—	—
1906	Early ..	15	13	2	—	—	—	—	—
	Serious ..	17	—	17	—	—	—	—	—
	Advanced ..	8	—	2	—	—	6	—	—

Sanatorium and Year.		Stage of disease on admission.	Total.	Arrested.	Much improved.	Improved or improved slightly.	Slight improvement, unimproved, or stationary.	Worse or unsatisfactory.	Left.	Died.
Hull and East Riding.										
1903	.. .. .	Early ..	12	—	8	4	—	—	—	—
		Moderately advanced.	34	—	9	17	8	—	—	—
		Advanced ..	12	—	—	3	9	—	—	—
1904	.. .. .	Early ..	8	—	6	2	—	—	—	—
		Moderately advanced.	31	—	7	15	9	—	—	—
		Advanced ..	8	—	1	1	6	—	—	—
1905	!	Early ..	11	—	8	—	3	—	—	—
		Moderately advanced.	19	—	8	9	2	—	—	—
		Advanced ..	8	—	—	1	7	—	—	—
1906	.. .. .	Early ..	7	—	6	1	—	—	—	—
		Moderately advanced.	22	—	7	8	7	—	—	—
		Advanced ..	7	—	—	1	6	—	—	—

Table showing condition on discharge in relation to stage of disease on admission, grouped according to Turban's classification or some slight modification thereof.

Sanatorium and Year.	Stage of Disease on ad- mission.	Total.	Cured or Arrested.	Relatively cured, very greatly or much improved.	Distinct improve- ment or im- proved.	Slight improve- ment, or station- ary.	Dismissed or sent home as hopeless.	Refused treatment.	Died.	Worse.
Crossley.										
1905	Stage 1	75	23	33	13	6	—	—	—
		Stage 2	27	2	5	11	9	—	—	—
		Stage 3	63	—	—	23	36	—	—	2
1906	Stage 1	45	19	10	10	5	—	—	1
		Stage 2	34	—	8	9	17	—	—	—
		Stage 3	31	—	1	9	17	—	—	4
Bowdon.										
1905	Stage 1	80	9	32	28	10	—	—	1
		Stage 2	102	—	9	57	29	—	—	6
		Stage 3	57	—	—	7	21	—	—	9
1906	Stage 1	37	8	17	9	3	—	—	—
		Stage 2	94	6	34	31	19	—	—	4
		Stage 3	73	—	12	16	29	15	—	1

Sanatorium and Year.	Stage of Disease on ad- mission.	Total.	Cured or Arrested.	Relatively cured, very greatly or much improved.	Distinct improve- ment or im- proved.	Slight improve- ment, or station- ary.	Dismissed or sent home as hopeless.	Refused treatment.	Died.	Worse.
Liverpool (Delamere).										
1906	Stage 1	33	—	31	3	—	—	—	—	—
	Stage 2	48	—	39	9	—	—	—	—	—
	Stage 3	61	—	17	33	10	—	—	1	—
1906	Stage 1	51	—	50	1	—	—	—	—	—
	Stage 2	38	—	27	10	1	—	—	—	—
	Stage 3	42	—	10	14	14	—	—	—	4
Devon and Cornwall.										
1904-5	Stage 1	15	8	6	—	—	—	1	—	—
	Stage 2	10	—	8	1	—	—	—	—	1
	Stage 3	24	—	4	18	—	—	—	—	2
1905-6	Stage 1	17	8	9	—	—	—	—	—	—
	Stage 2	24	—	23	—	—	—	—	—	1
	Stage 3	16	—	5	8	—	—	—	1	2
Daneswood.										
1903-4	1 Lobe	21	6	13	2	—	—	—	—	—
	2 Lobes	26	6	8	9	1	—	—	1	1
	3 Lobes	17	3	5	5	3	—	—	—	1
	4 Lobes	8	—	1	3	2	—	—	2	—
	5 Lobes	2	—	2	—	—	—	—	—	—
1906	1 Lobe	16	11	3	2	—	—	—	—	—
	2 Lobes	27	16	7	1	2	—	—	—	1
	3 Lobes	14	6	1	6	1	—	—	—	—
	4 Lobes	7	—	4	3	—	—	—	—	—
	5 Lobes	2	—	1	—	1	—	—	—	—
1906	1 Lobe	24	15	5	4	—	—	—	—	—
	2 Lobes	23	16	2	5	—	—	—	—	—
	3 Lobes	17	3	6	5	3	—	—	—	—
	4 Lobes	5	—	2	3	—	—	—	—	—
	5 Lobes	—	—	—	—	—	—	—	—	—

With a view to future comparison when sufficient sanatoria data have been collected, there have been abstracted from the medical report of the Brompton Hospital for Consumption the data contained in the subjoined tables. The figures antecedent to 1902 have been taken from the annual report of that year wherein the tables up to the year 1902 will be found. The table has been completed by reference to the subsequent annual reports.

Table comparing the results obtained (at Brompton) in 1902 and subsequent years with those recorded in 1852, 1862, 1872, 1882 and 1892 respectively for ordinary cases only; showing the percentage distribution of results according to the number of lobes affected on admission in those years.

Males.

Lobes involved.	Condition on discharge.	1852.	1862.	1872.	1882.	1892.	1902.	1903.	1904.	1905.
1	*Improved ..	72.7	69.8	73.4	70.0	70.7	89.2	91.4	95.9	91.9
	In statu quo ..	13.6	16.3	9.3	20.0	15.8	7.7	2.9	4.2	5.7
	Not so well ..	9.1	9.3	14.7	7.1	9.8	3.1	2.9	—	3.4
	Dead ..	4.5	4.7	2.6	1.9	3.8	—	2.9	—	—
2	Improved ..	66.0	56.0	66.3	60.7	65.1	75.7	83.8	90.8	92.2
	In statu quo ..	12.0	17.3	9.8	23.2	12.8	11.4	4.6	5.0	3.9
	Not so well ..	14.0	19.7	14.6	10.7	12.3	12.3	1.5	3.5	3.9
	Dead ..	8.0	4.9	7.3	5.4	9.7	.9	—	.7	—
3	Improved ..	61.0	44.9	59.6	60.6	45.6	74.3	79.5	70.3	73.8
	In statu quo ..	18.6	14.1	12.4	16.9	15.8	11.6	13.6	13.8	9.8
	Not so well ..	8.5	29.5	17.9	14.1	19.5	11.7	5.7	13.1	12.5
	Dead ..	11.8	11.5	10.1	8.4	19.0	2.3	1.1	3.8	3.8
4	Improved ..	—	35.0	41.9	33.3	34.9	53.3	63.0	61.6	57.4
	In statu quo ..	—	20.0	17.5	18.6	13.9	14.8	17.8	13.1	18.3
	Not so well ..	—	25.0	15.6	18.4	16.3	19.8	12.5	19.2	17.4
	Dead ..	—	20.0	25.0	29.7	34.9	11.8	6.8	6.1	6.9
5	Improved ..	13.3	17.1	23.8	20.5	18.8	26.4	37.8	29.2	36.6
	In statu quo ..	20.0	26.6	23.8	12.8	19.1	15.7	15.2	22.3	14.4
	Not so well ..	26.7	20.0	19.0	25.1	23.4	24.0	20.4	20.4	18.9
	Dead ..	40.0	34.3	33.3	43.6	47.7	34.0	26.5	28.0	30.0

Females.

Lobes involved.	Condition on discharge.	1852.	1862.	1872.	1882.	1892.	1902.	1903.	1904.	1905.
1	Improved ..	80.3	81.0	81.4	79.6	81.3	90.7	99.9	82.1	95.2
	In statu quo ..	11.5	10.3	8.5	7.9	5.1	4.6	—	12.8	3.2
	Not so well ..	6.1	6.9	8.5	12.5	8.5	4.6	—	5.1	1.6
	Dead ..	2.2	1.7	1.6	—	5.1	—	—	—	—
2	Improved ..	69.5	67.9	70.3	64.3	66.4	79.8	85.2	71.7	78.7
	In statu quo ..	13.1	14.3	12.1	16.7	7.3	17.8	14.8	16.2	12.8
	Not so well ..	10.1	14.3	9.5	11.9	12.7	5.4	—	12.1	8.5
	Dead ..	7.3	3.5	8.1	7.1	13.6	—	—	—	—
3	Improved ..	57.6	55.6	59.6	58.8	56.1	66.3	65.0	48.2	62.2
	In statu quo ..	12.5	19.3	12.3	14.7	11.2	11.2	10.0	25.2	12.0
	Not so well ..	14.3	17.6	17.4	11.8	15.5	14.6	25.0	22.6	21.4
	Dead ..	16.8	7.4	10.7	14.7	17.4	7.8	—	3.6	4.4
4	Improved ..	—	33.3	32.3	39.1	34.0	56.0	63.6	37.5	56.7
	In statu quo ..	—	30.0	29.4	26.1	10.0	12.0	7.0	26.8	18.3
	Not so well ..	—	16.6	17.7	8.7	28.0	14.0	30.2	28.0	20.0
	Dead ..	—	20.0	20.6	26.1	28.0	15.0	9.3	7.1	5.0
5	Improved ..	18.4	17.3	20.9	29.4	18.2	27.9	33.4	30.0	34.7
	In statu quo ..	25.3	15.6	11.6	11.8	4.6	16.3	11.1	22.2	4.3
	Not so well ..	22.1	34.4	25.6	11.8	27.2	30.2	18.5	25.0	17.4
	Dead ..	36.2	32.4	41.9	47.0	50.0	25.6	37.0	22.2	43.5

* In the earlier years patients who did well were all classed as "improved," but within recent years the term "much improved" has been added to the classification. In order, however, that the later results may be compared with the earlier, the earlier classification has been retained, i.e. the term "improved" in the latter years embraces "much improved" as well as "improved."

The table on previous page indicates that the results under each division have been much more satisfactory from 1902, and it is instructive to note that at that date the old system of artificial ventilation was replaced by natural ventilation.

Taking a general review of the above tables it will be obvious that very considerable disparity as regards the immediate results obtains at the several sanatoria, and the question arises as to whether these disparities are wholly real, or partly real and partly apparent. Whether, that is to say, the treatment adopted and the circumstances obtaining at one sanatorium are so superior to those adopted at another as to account for the marked differences observed, or whether such disparities are not, at least in large part, the consequence of the selection of cases in the first place, and the personal equation of the Medical Officer as regards the grouping of the results in the second place.

While it is impracticable to definitely solve this question, an attempt has been made in the tables furnished below by dealing collectively with the first two or three columns in the foregoing tables to indicate the differences which obtain and to show how the personal equation of the groupers may conceivably have influenced the figures.

It will be seen that in the great majority of cases some degree of immediate improvement ensues upon the sanatorium treatment. The immediate improvement which accrues to such a large proportion of the total number of cases, and especially of the early cases, suggests, as does the tuberculin and similar treatment, what an important place soil or tissue resistance occupies in the causation and arrest of tuberculosis. It, and the post-mortem records referred to in Chapter V. (page 104), suggests, as Sir James Crichton-Browne has expressed it, that "Even unaided the assailed lung is largely capable of protecting itself. The observation of a large group of cases brings home to us the truth that consumption is susceptible of spontaneous cure . . . and that in many instances its progress might be stayed, and its ravages repaired by some slight recoupment of the bodily powers."

As will have already been observed, Nature herself is busy recouping such powers, even although the disease has never been recognised; and it has also been shown how much Nature's efforts may be enforced and accentuated by the nourishment to be procured by a change from poverty to relative comfort. But as will be seen by the following tables, there is a very great difference in the several sanatoria as to the percentage of the total numbers treated, which evinces "slight or no improvement." When these tables are studied side by side with the accounts of the several sanatoria given in Part II., it is difficult to avoid the conclusion that, in addition to differences in the selection of "early" and "suitable" cases, the personal equation of the medical officers may have exercised a by no means minor influence upon the statistical tables. Be this as it may, it does not seem that a discussion of the results obtained at the several

sanatoria would serve any useful purpose, and it remains to examine in the next chapter how far the undoubted improvement secured in many of the cases has been maintained.

Tables furnishing percentage summary relative to six sanatoria in connection with which the term "cured" is the most favourable term employed as regards the condition of the patients on discharge. The figures in each instance relate to the period during which the sanatorium has been in operation.

Sanatorium and period to which figures relate.	Cured, absolutely, practically, pro- visionally, or re- latively.	Very great, very much, much, or great improve- ment.	Improved.	Slight, or no im- provement, or stationary.	Worse, or unsuit- able.	Doubtful.	Left for sundry reasons.	Died.
Durham (6 years)	17.7	62.3	13.8	1.2	5	—	—	.2
Leeds (6 years)	40.6	42.3	—	17.2	—	—	—	—
Bowdon (4 years)	5.9	20.5	20.4	26.5	9.4	8.7	—	.7
Devon and Cornwall (4 years).	63.4	10.3	23.2	2.1	5.2	—	4.7	2.1
Bradford Poor Law (2 years).	31.6	30.4	15.2	21.7	—	—	—	1.1
Crosley (2 years)	15.6	20.3	26.7	32	2.1	2.1	—	1.3

Similar table to above, but with columns 1 and 2 combined.

Sanatorium.	Cured, absolutely, practically, pro- visionally, or re- latively.	Very great, very much, much, or great improve- ment.	Improved.	Slight, or no im- provement, or stationary.	Worse, or unsuit- able.	Doubtful.	Left for sundry reasons.	Died.
Durham	79.9	—	13.8	1.2	5	—	—	.2
Leeds	82.8	—	—	17.2	—	—	—	—
Bowdon	26.4	—	20.4	26.5	9.4	8.7	—	.7
Devon and Cornwall ..	62.7	—	23.2	2.1	5.2	—	4.7	2.1
Bradford Poor Law ..	61.9	—	15.2	21.7	—	—	—	1.1
Crosley	36.9	—	26.7	32	2.1	2.1	—	1.3

Similar table to above, but with columns 1, 2 and 3 combined.

Durham	98.7	—	1.2	5	—	—	—	.2
Leeds	82.8	—	17.2	—	—	—	—	—
Bowdon	55.8	—	26.5	9.4	8.7	—	—	.7
Devon and Cornwall ..	85.9	—	2.1	5.2	—	4.7	2.1	
Bradford Poor Law ..	77.1	—	21.7	—	—	—	—	1.1
Crosley	62.6	—	32	2.1	2.1	—	—	1.3

Table furnishing percentage summary relative to eight sanatoria in which the terms "arrest" or "recovery" are the most favourable terms employed.

Sanatorium and period.	Arrest or recovery.	Very much, much, or great improvement.	Distinct improvement, or improvement.	Slight, or no improvement, or stationary.	Worse, or unsuitable.	Left.	Died.
Mount Vernon (6 years)	—	34·7	33·4	25·9	4	—	3
Nottingham (5 years)	24	33·1	28·3	7·5	7·2	—	—
Liverpool (Delamere) (5 years) .	—	64·6	21·7	12·9	—	—	·8
Hull and East Riding (4 years) ..	35·8	8·6	25·2	22·5	3·3	2	2·6
Heeswall (4 years)	41·2	7·5	33·7	17·1	·5	—	—
Daneswood (3 years)	38·7	28·3	22·6	6·1	3·3	—	·9
Northwood (2 years)	—	46·2	43·4	8·7	1·0	—	·7
Winsley (2 years)	27·6	35·3	23·6	12·6	—	—	·9

Similar table to above, but with results shown in first two columns combined.

Sanatorium and period.	Arrest or recovery.	Very much, much, or great improve- ment.	Distinct improve- ment, or improve- ment.	Slight, or no im- provement, or stationary.	Worse, or unsuit- able.	Left.	Died.
Mount Vernon	34·7		32·4	25·9	4	—	3
Nottingham	57·1		28·2	7·5	7·2	—	—
Liverpool	64·6		21·7	12·9	—	—	·8
Hull and East Riding	44·4		25·2	22·5	3·3	2	2·6
Heeswall	48·7		33·7	17·1	·5	—	—
Daneswood	67·0		22·6	6·1	3·3	—	·9
Northwood	46·2		45·4	8·7	1·0	—	·7
Winsley	62·9		23·6	12·6	—	—	·9

Similar table with results shown in first three columns combined.

Mount Vernon	67'1	25'9	4	—	3
Nottingham	86'3	7'5	7'2	—	—
Liverpool	86'3	12'9	—	—	'8
Hull and East Biding	69'6	22'5	3'3	2	2'6
Heeswall	82'4	17'1	'5	—	—
Daneswood	89'6	6'1	3'3	—	'9
Northwood	89'6	8'7	1'0	—	'7
Winsley	86'5	12'6	—	—	'9

Note on The Brompton Hospital Sanatorium, Frimley.

Since the foregoing chapter was written the sixty-sixth annual report of The Brompton Hospital for Consumption has been issued, and as it contains data relative to the Frimley Sanatorium, an abstract of these is herewith made in so far as they relate to immediate results.

These figures are of exceptional interest in that they have reference to very carefully selected cases which have apparently undergone preliminary treatment by residence in Brompton Hospital in order to ascertain the suitability or the reverse of the patients for sanatorium treatment in the modern sense of the term. The figures, in fact, should represent the best immediate results which it is practicable to obtain under existing conditions as regards selection and treatment, and the after-results will be looked forward to with the greatest interest by all students of the sanatorium problem.

It is important to note that no patient is discharged as showing "total arrest" until he has satisfactorily passed through a grade of work much more severe than he is ever likely to be afterwards subjected to, in following either his former calling or another which will provide him with means for comfortable living and sufficient food to maintain his health.

Discharged.	"Total arrest."	Much improved.	Improved.	Left at own wish.	Incurable.	Unimproved or worse.	Probably not tuberculous.	Died.
187	110	21	25	6	3	17 (a)	4	1 (b)

(a.) Of these, 9 were discharged after a stay of less than one month as unfit cases for sanatorium treatment.

(b.) This death was due to enteric fever.

Average length of stay in the sanatoria was—

For arrested cases	...	...	...	176 days.
Much improved	...	...	...	154 days.
Improved	...	...	...	112 days.

For detailed account of this sanatorium see Part II., page 465.

CHAPTER XIV.

LASTING EFFECTS OF SANATORIUM TREATMENT.

An all-important aspect of the sanatorium question, *the lasting effects of sanatorium treatment*, is approached in different fashion in the several reports relative to sanatoria in this country. As regards, however, not a few of these institutions the matter is not dealt with statistically in the annual reports. If the data have been procured they have not been published.

In particular instances, and I would make special mention of Durham in this connection, the records are kept in a fashion which enables the data for each year to be viewed separately. The advantage of this course is that it is possible for the reader to ascertain at once how many of the cases discharged, say in 1902, are still working or are alive in 1906, and how many have died during the interval.

The more common practice is, however, to arrange all the after-results together, and in such fashion as to include with cases discharged perhaps four years ago those who may only have left the sanatorium a few weeks or months. In this way the "after-results" are apt to appear in an unduly favourable light, and accordingly it would always prove useful if, when such grouping is adopted, the Durham method was also employed. But further reference is made to this subject later in this chapter.

The Kelling method of excluding from the table relative to after-results the cases treated during the immediately preceding year has the advantage of increasing the value of the records.

It will be noted, too, that in the tables which follow there is considerable diversity in the terms employed to connote the several conditions. Not only, as has already been observed, does the use of the term "fit for work" need some constant value attached to it for comparative purposes, but it is desirable to know also, if possible, the relation of the wages earned after discharge to those which were earned prior to the breakdown.*

* Dr. Noel Bardswell has recently made some investigations in this sense, and he has been good enough to send me such data as he had collected prior to the completion of this chapter. In the case of 16 consumptive working men Dr. Bardswell was able to obtain data with reference to 12, and in every instance there had been a material reduction in the amount of wage earned. As regards the Durham Sanatorium Dr. May had no definite data, but he expressed a decided opinion that the majority of the patients have to return to less remunerative work, although, wherever possible, a return to the same work in the case of skilled workmen is advised. With reference to the Kelling Sanatorium, Dr. F. J. Fanning obtained data with respect to 65 discharged patients. In 22 instances where the patient returned to some other employment there was an increase of wage in eight, a decrease in 13, and a stationary condition in one, while out of 43 who returned to the same occupation there was an increase in 14, a decrease in nine, and a stationary condition in 19. Dr. Fanning has been successful in winning the sympathy and assistance of employers, and has also been afforded opportunities of training men to become chauffeurs, an occupation for which at the present time there is an exceptional demand.

Similarly explanations should be given of terms such as "in good health," "in fair health," "improvement maintained," &c.

Here again no attempt at comparisons between the several sanatoria has been made. The figures alone are furnished, and persons desirous of instituting comparisons may procure data necessary to do so by a reference to the separate accounts given in Part II. of this report of the several institutions.

Durham Sanatorium.

Table of results in April, 1907, relative to cases discharged during the seven years 1900-1907, exclusive of cases which remained in the sanatorium for less than three weeks, or who died within the same period. The figures in brackets represent the state of affairs in 1906.

Year.	Cases discharged.		Condition on April 30th, 1906 and 1907.					Percentage of total discharged at work in April, 1906 and 1907.	At home, dead, or lost sight of.
	Total.	Returned to work.	At work.	At Home.	Dead.	Lost sight of.			
1900-1901	36	28	(12) 6	(—) 1	(21) 21	(3) 8	(33·3) 16·7	33·3	
1901-1902	55	35	(20) 12	(—) 1	(27) 28	(8) 14	(36·4) 21·8	78·2	
1902-1903	79	53	(25) 15	(2) 3	(42) 44	(10) 17	(31·6) 19·0	31·0	
1903-1904	98	62	(47) 30	(14) 9	(35) 35	(2) 24	(48·0) 30·6	69·4	
1904-1905	112	71	(61) 34	(25) 9	(25) 41	(1) 28	(54·5) 30·4	69·6	
1905-1906	141	86	(86) 59	(36) 12	(19) 42	(—) 28	(61·0) 41·8	58·1	
1906-1907	153	87	82	46	25	—	53·6	46·4	
Totals	674	417	(251) 238	(77) 81	(169) 236	(24) 119	35·3	64·7	

The above table shows the after-results as regards the whole of the cases (with the exceptions mentioned) considered together, but the tables given below bring out very clearly the difference which obtains with reference to these after-results in "early" and "advanced" cases.

Durham Sanatorium.

Summary of results obtained during seven years 1900-1907.

(1) Early or consolidated cases.

Year.	Cases discharged.		Condition on April 30th, 1907.				Percentage at work in April, 1907.
	Total.	Returned to work.	At work.	At Home.	Dead.	Lost sight of.	
1900-1901 ...	16	14	6	—	4	6	37·5
1901-1902 ...	30	28	11	1	9	9	36·7
1902-1903 ...	41	30	10	3	20	8	24·4
1903-1904 ...	59	46	29	4	11	15	49·2
1904-1905 ...	75	57	31	4	21	19	41·8
1905-1906 ...	84	63	44	8	19	13	52·4
1906-1907 ...	101	70	66	27	8	—	65·3
Totals ...	406	308	197	47	92	70	48·5

(2) Advanced or cavity cases.

Year.	Cases discharged.		Condition on April 30th, 1907.				Percentage at work in April, 1907.
	Total.	Returned to work.	At work.	At Home.	Dead.	Lost sight of.	
1900-1901 ...	20	9	0	1	17	2	Nil
1901-1902 ...	25	12	1	—	19	5	4.0
1902-1903 ...	88	28	5	—	24	9	18.2
1903-1904 ...	59	16	1	5	24	9	2.6
1904-1905 ...	87	14	8	5	30	9	8.1
1905-1906 ...	57	23	15	4	28	15	26.3
1906-1907 ...	52	17	16	19	17	—	30.7
Totals ...	268	114	41	84	144	49	15.8

The Sanatorium Committee commenting upon the above figures in the Annual Report for 1906-7 remark:—

Of 406 "early" cases treated and discharged, 303 were enabled to work, and of these 197 are known to be still at work for periods varying from a few months to six and three-quarter years, and 70 have been lost sight of, and most of these are probably at work, seeing that they were amongst the best cases on discharge.

Of 268 "advanced" cases, 114 were enabled to return to work, and 41 of them are known to be still at work and have been so for periods varying from a few months to six years, and 49 have been lost sight of.

Considering the comparatively short stay in the Sanatorium, the poverty and bad surroundings of many of the patients, the Committee think these figures eminently satisfactory, both as regards numbers and permanence of the result. They would, however, emphasize the paramount importance of the patients being treated in the Sanatorium in the earliest stage of the disease, as many of the advanced cases relapse on returning to their old surroundings.

Worcestershire Sanatorium.

Table of all Cases considered together with the exception of 29 cases admitted on probation.

Year.	Total.	Condition in December, 1906.			
		At Work.	At Home.	Dead.	Untraced.
1903 ...	43	16	5	20	2
1904 ...	44	18	10	16	—
1905 ...	54	32	16	5	1
1906 ...	32	23	9	—	—
Totals ...	173	89	40	41	3

If the 29 cases admitted on probation be added, the totals become somewhat as follows :—

Totals	202	89	? 48	62	3
---------------	-----	----	------	----	---

Summary of results obtained with 88 “early” cases from 1903–1906.

Year.	Total.	Condition in December, 1906.			
		At Work.	At Home.	Dead.	Untraced.
1903	22	16	3	2	1
1904	23	18	2	3	—
1905	28	24	4	—	—
1906	15	14	1	—	—
Totals ...	88	72	10	5	1

The annual report for 1906 states relative to the above table that “of these early cases no less than 93 per cent. are (and have been in some cases for nearly four years) in good health, and 82 per cent. of these cases are at work.”

Summary of 85 “more severe cases” treated from 1903–1906.

Year	Total.	Condition in December, 1906.			
		At Work.	At Home.	Dead.	Untraced.
1903	21	—	2	18	1
1904	21	—	8	13	—
1905	26	8	12	5	1
1906	17	9	8	—	—
Totals ...	85	17	30	36	2

Commenting upon the above table the annual report for 1906 says that “it could not be expected that the results in these cases could be so satisfactory, as but 17 are able to continue their work. Where this is otherwise, it should not be forgotten that lives have been prolonged, and further patients have been educated to live as would not only benefit themselves, but lessen the risk of infection to others.”

As regards the 29 “advanced cases admitted on probation,” the annual report states that “21 are dead ; in no case was any permanent benefit expected, nor has any lasting good been done to these patients by their admission.”

Westmorland Sanatorium.

Summary of after-results for years 1900-1905 inclusive, exclusive of cases which remained in the Sanatorium for less than a month or cases handicapped by any serious non-tubercular complication. The only cases here dealt with are those admitted from Westmorland and North Lonsdale.

—	Years.	Totals (including 30 re- admissions).	Condition on December 31st, 1906.					
			Quite well.	Well or Fairly well.	Relapsing, Falling, Feeble or Morbid.	Re- admitted.	?	Dead.
<i>All cases grouped together.</i>	1900...	38	11	2	2	—	—	18
	1901...	42	17	8	1	—	—	21
	1902...	40	19	8	2	—	1	15
	1903 ..	28	14	2	8	—	—	9
	1904 ..	38	24	2	2	—	—	10
	1905...	86	12	7	10	—	1	6
Totals ...	...	217	97 44.7%	19	20	—	2	79

Differentiation as regards after-results between "Slight," "Moderate," and "Advanced" cases.

—	Years.	Totals.	Condition on December 31st, 1906.					
			Quite well.	Well or Fairly well.	Relapsing, Falling, Feeble or Morbid.	Re- admitted.	?	Dead.
<i>(a)</i> "Slight" ...	1900...	4	4	—	—	—	—	—
	1901 ..	10	10	—	—	—	—	—
	1902...	14	12	1	1	—	—	—
	1903...	11	10	—	1	—	—	—
	1904...	18	12	1	—	—	—	—
	1905...	4	8	1	—	—	—	—
Totals ...	...	56	51 91.1%	8	2	—	—	—

(a) Tubercle bacilli found in only one case : frequently there was no expectoration.

a	Years	Totals	Condition on December 31st, 1906.					
			Quite well.	Well or Fairly Well.	Relapsing, Failing, Feeble or Morbid.	Re-admitted.	?	Dead.
(b) "Moderate" ...	1900...	12	6	1	2	—	—	8
	1901...	14	6	3	—	—	—	5
	1902...	16	6	1	1	—	1	7
	1903...	6	3	2	—	—	—	1
	1904...	13	10	1	1	—	—	1
	1905...	16	7	3	5	—	1	—
Totals ...	...	77	38 49·4%	11	9	—	2	17
(c) "Advanced" ...	1900...	17	1	1	—	—	—	15
	1901...	18	1	—	1	—	—	16
	1902...	10	1	1	—	—	—	8
	1903...	11	1?	—	2	—	—	8
	1904...	12	2	—	1	—	—	9
	1905...	16	2	3	5	—	—	6
Totals ...	...	84	8 9·5%	5	9	—	—	62

(b) Tubercle bacilli found in 48 instances.

(c) Tubercle bacilli found in all but five cases.

Liverpool Sanatorium (Delamere).

Table showing the condition in February 1904 of all patients who had left the sanatorium since September 1901.

Total discharged.	In good health.	In fair health.	More or less invalids.	Dead.	No information obtained.
238	113 or 47·5 %	37 or 15·5 %	36 or 15·1 %	30 or 12·6 %	22 or 9·2 %

The Medical Superintendent informed me in 1904 that as regards the 22 who failed to respond, some probably have died but others were, he believed, at work.

No further figures relative to "after-results" have, I believe, been published in the annual reports of this institution.

Nottingham Sanatorium.

Table relative to 359 patients who left the sanatorium between February 1902 and December 31st, 1906.

Total discharged.	A. Well and at work.	B. Well but not working.	C. Not well but working.	D. Not well and not working.	E. Worse.	F. Dead.	G. Not heard from.
359	174 or 48·5 %	21 or 5·8 %	7 or 1·9 %	22 or 6·1 %	8 or 2·2 %	98 or 27·8 %	29 or 8·1 %

Note by Resident Medical Officer in annual report for 1904 :

"Some of those in class B are not obliged to work and are known to be as well as some of those in Class A who report themselves as 'well and at work.' Obviously financial conditions and individual temperament influence this classification."

Kelling Sanatorium.

Table showing after-results at intervals of from 12 to 45 months as regards 188 patients discharged during 1903 and 1904.

During 1903 and 1904.	On discharge.	Maintained condition.	Relapsed but living.	Dead.	No history.
Fit for work ...	75	55 or 73·33 %	13 or 17·33 %	4 or 5·33 %	3 or 4·00 %
Fit for light work ...	63	28 or 44·44 %	19 or 30·16 %	14 or 22·22 %	2 or 3·17 %
Improvement ...	24	6 or 25·00 %	5 or 20·83 %	13 or 54·17 %	—
No improvement ...	11	—	—	11 or 100·00 %	—
Retrogressive ...	15	2 or 13·33 %	—	13 or 86·67 %	—
	188	91	37	55	5

It will be noticed that in this table all patients discharged as recently as 1905 have been omitted, and thus cases which have only left the sanatorium a few months do not disturb the figures.

These Kelling after-results have been expressed differently and brought up to date in a later report ; the cases on admission having been grouped into practically three groups (*see separate report*).

- 1 & 2 = Suitable.
 3 = Less suitable.
 4 = Unsuitable.

The total number of cases dealt with was 326 discharged from the sanatorium during 1903-4-5, their condition on admission being as follows :—

Groups.	Total.	Fit for work.	Fit for light work.	Im- proved.	Unim- proved.	Retro- gressive.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
No. 1 ...	111	83.78	10.81	1.80	—	3.60
No. 2 ...	38	50.00	36.84	5.26	2.63	5.26
No. 3 ...	52	17.31	51.92	23.08	—	7.69
No. 4 ...	125	5.60	31.20	34.40	16.00	12.80
Totals	326	39.27	28.22	18.09	6.44	7.97

The subsequent history of these 326 cases at intervals of from one to three and half years was as follows :—

Nos. 1 and 2 (suitable) cases, 60.66 per cent. had maintained their condition.

No. 3 (less suitable) cases, 35.30 per cent. had maintained their condition.

No. 4 (unsuitable) cases, 20 per cent. had maintained their condition.

No. 1 and 2 (suitable) cases, 15.93 per cent. relapsed and 3.54 per cent. died.

No. 3 (less suitable) cases, 25 per cent. relapsed and 12.50 per cent. died.

No. 4 (unsuitable) cases, 42.85 per cent. relapsed and 28.57 per cent. died.

Devon and Cornwall Sanatorium.

Table showing condition in July 1906 of all patients discharged in 1903-4, 1904-5 and 1905-6.

Discharged.	Total.	At work.	At light work.	Invalid.	Dead.	Not heard of.
1903-4	48	13 or 27.1 %	1 or 2.1 %	1 or 2.1 %	26 or 54.2 %	7 or 14.6 %
1904-5	48	11 or 22.9 %	5 or 10.4 %	2 or 4.2 %	23 or 47.9 %	7 or 14.6 %
1905-6	57	29 or 50.9 %	4 or 7.0 %	11 or 19.3 %	9 or 15.8 %	4 or 7.0 %

Table showing as regards the same sanatorium the after results the relation of condition to stage of the pulmonary tuberculosis on admission.

Dis- charged.	Stage of malady.	Total.	Fit for work.	Fit for light work.	Invalid.	Died of Phthisis.	Died of other diseases.	Re- admitted.	Not heard of.
1903-4..	Early cases ..	18	10 or 55.6%	3 or 16.7%	1 or 5.6%	—	2 or 11.1%	1 or 5.6%	1 or 5.6%
	Advanced cases	29	2 or 6.9%	4 or 13.8%	2 or 6.9%	17 or 58.6%	1 or 3.4%	—	3 or 10.5%
1904-5..	Early cases ..	14	10 or 71.4%	2 or 14.3%	—	—	—	—	2 or 14.3%
	Advanced cases	34	4 or 11.8%	5 or 14.7%	7 or 20.6%	15 or 44.1%	2 or 5.9%	—	1 or 2.9%

Commenting upon these results, the Medical Superintendent observes in his annual report for 1904-6 :

“The figures of after-results are by no means good. The chief cause is that the patients delay coming until the disease is far advanced, so that even if they can be brought to the stage of relative cure by sanatorium treatment, the strain of returning to their old surroundings is too much for them, and they break down again.

“The results point to the importance of the two questions referred to before, the discovery of early cases and the formation of a colony or other means of taking care of patients after leaving.”

Winsley Sanatorium.

In his second annual report (that for 1906) Dr. E. Dunbar Townroe, the Medical Superintendent, states that since the opening of the sanatorium in November, 1904, there have been discharged 355 patients. As to these the report observes :—

“Of these 97, or 27 per cent., informed us of the fact that they were at their several occupations at the end of four months from the date of their discharge. Many patients had changed their address, and as many had gone abroad, it is probable that there were others at work. Again, many of them, it is fair to state, had changed their former employment, and a fair percentage were working short hours. At the end of six months 62, and at the end of nine months 53 were working. Finally, at a period of 18 months after discharge, reports have reached us that 64 patients, or 18 per cent. have been at work for periods varying from 9 to 18 months.” Dr. Townroe adds that when the enquiries have been fully answered he hopes to be able to give a detailed account of the occupation of the patients,

Hull and East Riding Sanatorium.

Table showing condition on December 31st, 1906, of patients who were discharged up to the end of 1905, and who had consequently left the sanatorium at least 12 months previously.

Date of discharge.	Number discharged.	Improvement maintained.	Worse.	Dead.	Unaccounted for.
1902 ...	46	5 or 10·9 %	—	33 or 71·7 %	8 or 17·4 %
1903 ...	56	5 or 8·9 %	1 or 1·8 %	37 or 66·1 %	13 or 23·2 %
1904 ...	45	6 or 13·3 %	2 or 4·4 %	17 or 37·8 %	20 or 44·4 %
1905 ...	36	7 or 19·4 %	2 or 5·6 %	16 or 44·4 %	11 or 30·6 %
Totals..	183	23 or 12·6 %	5 or 2·7 %	103 or 56·3 %	52 or 28·4 %

Dr. Sproule, the Medical Superintendent, who has been good enough to furnish me with the above statistics, tells me that probably many of those "unaccounted for" are dead. The chief feature of this institution is that the patients are all very poor, although they are by no means "paupers," being for the most part sent into the sanatorium by their employers, who are responsible for an initial payment of £13. When, too, they come to the sanatorium, they can only afford to stay for a short time, and when they leave they are compelled by force of circumstances to return to some kind of work at once. It will be seen how disappointing these "after results" are; *i.e.*, of 183 cases discharged between 1902-1905 only 23 or 12·6 per cent. had maintained their improvement, while the remaining 160 were either "worse," "dead," or "unaccounted for."

Maitland Cottage Sanatorium.

Table showing condition in June 1905 of 219 patients discharged during six years—June 1899 to June 1905, and exclusive of 20 who were hopeless at first and 29 others who did not improve.

Stage of disease on admission.	Total.	Working.	Chronic.	Chronic or dead.	Dead.	Unknown.
Early ...	98	90·8 %	—	8 %	—	2 %
Moderate ...	64	53 %	25 %	—	17 %	5 %
Advanced ...	57	12 %	22 %	—	66 %	—
	219					

Commenting upon these figures, the Medical Superintendent observes :

"Taking the whole of the 219 cases, and excluding 20 who were hopeless and 29 others who did not improve, the figures work out as follows :—

65% of all patients were at work in June 1905.

17% of all patients were dead in June 1905.

18% of all patients were chronic in June 1905."

Liverpool Poor Law Sanatorium, Heswall.

Table showing condition in December, 1903, of 34 cases discharged during 1903.

Cured.	Improved or much improved.	Little or no improvement.	In hospital, infirmary, or bed.	Address unknown.	Dead.
1	5	7	4	12	5

Table showing condition at end of 1904 of all the 38 Liverpool Union patients discharged from the Sanatorium since its opening up to December 24th of that year :—

Total discharged.	Diseases apparently arrested.	Working and feeling well.	Doing odd jobs.	Died of Phthisis or other diseases.	Worse.	In infirmary, hospital, or sanatorium more or less permanently or at intervals for phthisis or other diseases.	Not recently heard of.
38	3	2	3	9	3	13	5

Table furnished by Dr. Nevins relative to the condition on December 1st, 1905, of 25 Liverpool Union cases discharged during 1904.

Total discharged.	Apparent arrest.	Fit for work more or less.	Not fit for work.	Dead.	Recently discharged or not heard of.
25	3	12	5	2	3

After-results in cases treated at different sanatoria under the auspices of the Charity Organisation Society.

As stated earlier in this chapter I am indebted to Colonel Montefiore for kindly arranging the data relative to his cases in a manner which enables the results of each year's treatment to be studied separately.

Table showing condition in October, 1906, of patients who left the sanatoria in the undermentioned years :—

Year.	Total Leaving.	Well, Working, or Fit for Work.	Improved, Fit for Light Work.	Unimproved or Relapsed.	Dead.	Unreported.
1902 ...	7	3 or 42·9%	—	—	3	1
1903 ...	33	10 or 30·3%	4	4	14	1
1904 ...	54	24 or 44·4%	9	5	16	—
1905 ...	45	24 or 53·3%	7	9	5	—
1906 ...	23*	13 or 56·5%	4	4	2	—
Total...	162	74 or 45·7 %	24	22	40	2

* Number of patients who had left prior to October 1st, 1906.

Having regard to the interest of these figures from the point of view of the selection of cases of phthisis through the channels of organised charity, it is of interest to look into them rather more closely.

It has to be noted that 23 of the cases comprised within the above table had left the sanatoria for a very short period, and in considering the totals it may be useful to exclude them.

Dealing, therefore, with 139 patients, all of whom had left the sanatoria for more than nine months, and some of which have left more than three years, the following results are obtained :—

Total.	Well, Working, or Fit for Work.	Improved, or Fit for Light Work.	Unimproved or Relapsed.	Dead.	Unreported.
139	61	20	18	38	2

while if all cases discharged for less than 21 months be excluded, the results become—

Total.	Well, Working, and Fit for Work.	Improved, or Fit for Light Work.	Unimproved or Relapsed.	Dead.	Unreported.
94	37	13	9	33	2

i.e., of 94 carefully selected patients discharged from sanatoria at intervals of from 21 months to about four years—

39.4 per cent. were at work,
 13.8 " " improved or fit for light work,
 9.6 " " unimproved or relapsed,
 35.1 " " dead,
 2.1 " " unreported.

Although these tables relative to "after-results," especially those having reference to the Durham sanatorium, are instructive, and in many cases at least, encouraging, they do not bring out as clearly as could be wished the degree in which the improvement accruing to the patients in any given year is, or is not, maintained in subsequent years.

In this matter there is still something to be learnt from the German statistics, and, by way of affording an illustration of the methods of tabulation sometimes adopted in that country, two tables which serve to bring out the point above referred to, are herewith furnished.

From the first of these tables it will be seen that during 1899, 74 patients out of every 100 treated (*i.e.*, 74 per cent.) were on *discharge* capable of performing at least one-third the amount of their usual work. By the end of 1899 this 74 had fallen to 67, in 1900 to 48, in 1901 to 40, in 1902 to 35, and in 1903 to 32, *i.e.*, at the end of five years there were 32 patients out of every 100 treated still capable of at least one third of their former normal working capacity, and the remainder of this table may be read in like fashion. In the second table the percentages have reference not to the total number treated, but to those treated *with success*.

TABLE I.

	Out of every 100 tuberculous patients treated					
Year in which treatment ended.	There were in the year indicated the undermentioned numbers who possessed at the end of the treatment the desired success—capacity for work in the sense of the invalidity law.	There were year by year as indicated below the following number still retaining their capacity for work.				
		1899.	1900.	1901.	1902.	1903.
1899 ...	74	67	48	40	35	32
1900 ...	72	—	66	49	41	37
1901 ...	77	—	—	70	53	45
1902 ...	78	—	—	—	73	59
1903 ...	80	—	—	—	—	75

TABLE II.

Year in which treatment ended.	Showing per cent. of tuberculous persons treated, the number who had regained their capacity for work at the end of the treatment, i.e., who were not in receipt of invalidity allowance.	Out of every 100 persons <i>treated with success</i> there were at the end of the year indicated the following number still maintaining their condition.				
		1899.	1900.	1901.	1902.	1903.
1899 ...	74	92	67	55	47	43
1900 ...	72	—	92	69	58	52
1901 ...	77	—	—	93	72	42
1902 ...	78	—	—	—	94	76
1903 ...	80	—	—	—	—	94

It may be worth while to examine certain of the English sanatorium figures somewhat in the above light, and as the Durham statistics extend over seven years and have yielded good results they may be selected, more especially as they are one of the few series of statistics which have been kept in a fashion which enable the German methods to be applied to them. In the first instance it will be well to be clear as to what cases the Durham statistics comprise. They include apparently all cases which have been treated in the institution *except such cases as have remained under a month or who have died while within the sanatorium*. It is, however, of great importance to note that of the total number of cases dealt with, 119 have been "lost sight of." It would obviously be wrong to assume that none of them are working. The cases which obtain admission to the institution have been selected in the usual fashion.

The following tables indicate year by year both for the cases considered as a whole, as also separately as "early" and "advanced" cases, the number of cases discharged, and the condition of such cases as regards ability to work in successive years since their discharge from the institution. For instance, taking first the cases as a whole, it is seen that of 36 cases discharged in 1900-1 there were 23 at work on April 30, 1901, the number of cases thus working undergoing gradual decline until April 30, 1907, when the total, 36 discharged, has been reduced in so far as work is concerned to 6, or 16·7 per cent. The cases discharged in subsequent years can be followed up in like fashion.

Durham (Stanhope) Sanatorium.

TABLE I.—ALL CASES CONSIDERED TOGETHER.

Year of discharge.	Number discharged.	Number at work on April 30th of each year since discharge.							Percentage at work in April, 1907.
		1901.	1902.	1903.	1904.	1905.	1906.	1907.	
1900-1	86	23	18	15	14	15	12	6	16·7
1901-2	55	—	35	32	22	21	20	12	21·8
1902-3	79	—	—	53	36	32	25	15	19·0
1903-4	98	—	—	—	62	51	47	30	30·6
1904-5	112	—	—	—	—	71	61	34	30·4
1905-6	141	—	—	—	—	—	86	59	41·8
1906-7	158	—	—	—	—	—	—	82	53·6

TABLE II.—EARLY CASES SEPARATELY CONSIDERED.

1900-1	16	14	12	12	10	12	10	6	37·5
1901-2	30	—	23	24	17	17	17	11	36·7
1902-3	41	—	—	30	26	23	16	10	24·4
1903-4	59	—	—	—	46	41	39	29	49·2
1904-5	75	—	—	—	—	57	48	31	41·3
1905-6	84	—	—	—	—	—	63	44	52·4
1906-7	101	—	—	—	—	—	—	66	65·3

TABLE III.—ADVANCED CASES SEPARATELY CONSIDERED.

1900-1	20	9	6	8	4	3	2	0	Nil
1901-2	25	—	12	8	5	4	3	1	4·0
1902-3	33	—	—	23	10	9	9	5	13·2
1903-4	39	—	—	—	16	10	8	1	2·6
1904-5	37	—	—	—	—	14	13	3	8·1
1905-6	57	—	—	—	—	—	23	15	26·3
1906-7	52	—	—	—	—	—	—	16	30·7

Taking the early cases separately it will be seen that of the 16 such cases discharged in 1900 1 there were 6, or 37·5 per cent. at work from six to seven years later; of the 30 discharged in 1901-2, 11 were still at work, and so on up to the present time. Taking the advanced cases also, it is seen that in so far as work is concerned, the complete story has been told as regards the 20 cases at the end of the sixth year, and that of the 25 cases discharged in 1901-2, there was but one worker left in 1906-7.

The records of other sanatoria might be dealt with in similar fashion, but as regards the majority of institutions, the statistics are not furnished in a fashion which enable the results to be thus tabulated, and I would suggest that in future the data be so kept and arranged as to allow of test in this manner to be made.

Reviewing the after-results as set forth in this chapter it may be said that those yielded at certain sanatoria are decidedly encouraging, while others are so, if at all, in a very minor degree. The net result is to show that when "early" and "suitable" cases can be secured a considerable percentage of such cases may be returned to the ranks of the active workers and remain in those ranks for several years. As illustration thereof reference may be made to the figures relative to the Durham, Westmorland, and other sanatoria. There is, however, difficulty in arriving at any precise conclusion as to after-results in the several sanatoria, because it is not always quite clear as to what cases are comprised in such after-results, and it is obvious that differences in practice in this respect are likely to seriously modify the percentages.

Apparently, in cases such as Durham, where the figures are clearly set forth, the number of surviving workers becomes smaller and smaller as the interval since their discharge from the sanatoria increases, and if all cases be considered together, at the end of four or five years, some 60 per cent. have fallen out from one or other reason. It will be seen, however, that the statistics of several sanatoria, more especially those in connection with poor law institutions, would, if set out in similar fashion, yield markedly inferior results.

With the object of procuring more detailed information for statistical purposes as regards both immediate and after-results, two forms have been drawn up, after consultation with several medical superintendents of sanatoria, for the use of boards of guardians sending patients to sanatoria. Specimens of these forms follow page 186, and it would serve a very useful purpose if data on somewhat similar lines could be collected and recorded with reference to all patients at public sanatoria.

The classification adopted is a slight modification of that of Turban, and it has been employed because it is the grouping which is being increasingly brought into use at the more important public sanatoria in this country. The modification which has been introduced aims at distinguishing the lung affected by the letters R and L according as to whether the right or left lung is involved, the letters R + L being used when both lungs are involved. It appears that this classification is nearly identical with that proposed and provisionally adopted at the meeting of the International Anti-Tuberculosis Association held in Vienna in the autumn of 1907, such classification to be known as the Turban-Gerhardt. (See German "Tuberculosis," Vol. 6, No. 11.)

SUMMARY AS REGARDS THE THREE FOREGOING CHAPTERS.

It appears from the three preceding chapters, although it must not be assumed that all the patients who improved would otherwise have gone from bad to worse, that the *immediate* results of sanatorium treatment are in the majority of cases encouraging, and that the degree of improvement varies, generally speaking, in direct relation to the earliness and suitability of the cases. The practical inference from these considerations is the organisation of better machinery and the promotion of suitable educational methods whereby early and suitable cases may be brought under "open-air" treatment, whether at a sanatorium or elsewhere, in greater and increasing numbers. Obviously, all this is very largely a matter of the education of the poorer classes, and the provision of some organized system, whereby they may, when illness threatens, have an inducement to seek medical assistance at once. In this connection special attention may be directed to the chapter on the German Workmen's Insurance, wherein is set forth the manner in which these very inducements are provided for by this system.

As regards the after-results there are fewer data upon which to base provisional conclusions. It is only in the case of certain sanatoria that the after-results are recorded in a manner which enables anything approaching reliable conclusions to be arrived at. Where the after-results are set out so as to afford an opportunity of studying them, the statistics from the different sanatoria point to very divergent conclusions. In these instances, however, the class from which the patients are drawn and the methods of selection adopted at the several institutions must be kept in view.

The omission on the part of several sanatoria to publish after-results is due in considerable degree to the difficulty of keeping in touch with patients after they have left the sanatoria; but it is to be feared that it is also due, likewise in a considerable degree, to the disparity between the actual results obtained and the optimistic prophecies made by some persons at the inauguration of the sanatorium movement in this country. Hence it has come about that as the original expectations have not been altogether fulfilled, there is a natural disinclination to face the facts and to promote a better organisation, whereby cases of pulmonary tuberculosis may be diagnosed and sent to sanatoria at an earlier period of the malady than has hitherto been the case.

It is regrettable that further data with regard to after-results are not forthcoming in this country, and it is to be hoped that it will in the future be regarded as an essential feature of an annual report that it should embody the best available data in this sense.

But here again the statistics, so far as they go, point to the conclusion that with early and suitable cases the working

capacity of a large proportion of the patients can be prolonged. It is difficult to determine the degree of prolongation since it is impossible to ascertain how many of the early and suitable cases might have continued work and, if so, for how long, had they not entered a sanatorium, and as has already been shown in Chapter VI., in pre-sanatorium times working capacity has been often retained for very many years. But it is allowable to infer from the fact that a large proportion of the moderate and advanced cases tend rapidly to relapse after leaving the sanatoria, that by entering these institutions at an early phase of their illness the working period of a large number of the patients in the early stage of the disease has been materially extended, and that in a smaller number of cases the disease has become arrested.

When the after-results have been separately stated for early, moderate, and advanced cases, it is seen that the prospects of continued working capacity for the advanced cases are very far from encouraging, and as illustrative of this fact a reference may be made to the reports relative to the Heswall (page 277) and Bradford (page 530) Poor Law Sanatoria, as also to the report on the Hull and East Riding Sanatorium (page 544). It will be noted that in the case of Bradford the introduction of better-class patients has improved both the "tone" and the statistical results.

The evidence from practically all the sanatoria shows that in order to obtain the best results as regards working capacity two things are eminently desirable. The one is that the patient shall be a suitable patient, and that he shall remain at the sanatorium long enough to prove by actual experience while at the institution that he is actually competent to work; the other is that there shall, if practicable, be a period of "after-care" when the patient may gradually become accustomed to full work, and where he may, if necessary, learn the means of gaining a livelihood in a manner best suited for the maintenance of his health. In some sanatoria, such as Kelling (page 431) and Brompton (page 465), these two conditions are largely fulfilled while the patient is still at the sanatorium, but in other institutions the length of sojourn is too short, and the opportunities for practising work too scanty to enable the crucial test to be applied.

The evidence adduced in the several annual reports freely quoted from in the foregoing chapters also brings out clearly the importance of a sufficient length of stay in the sanatorium, and their can be no question that were a longer sojourn than generally takes place practicable materially better results would accrue. In some of the sanatoria efforts to this end are being made by discharging unsuitable and unpromising cases at an early date, and keeping the more hopeful cases for a longer period or, by admitting cases nominally for educational purposes for a short period, and selecting from such cases patients, who are reacting well, for prolonged treatment. However such prolongation of treatment is brought about, the ability of a prospective patient to

reside for a considerable period at the sanatorium, *paribus* determine his selection for a vacant bed.

The tendency to retain sanatoria and indeed hospital cases affording a reasonable prospect of "cure" and return to "full working capacity" suggests desirability of differentiation whereby certain institutions shall perform the humbler but not less useful rôle of relieving of those who cannot either be "cured" or have "arrested," but who may be very materially improved. Lives may be prolonged. It is to be feared that estimates formed in the first instance as to sanatorium have re-acted rather hardly upon a class which find admission to sanatoria, a relatively easy matter. Still there is still need for *hospitals* as distinct from *sanatoria*.

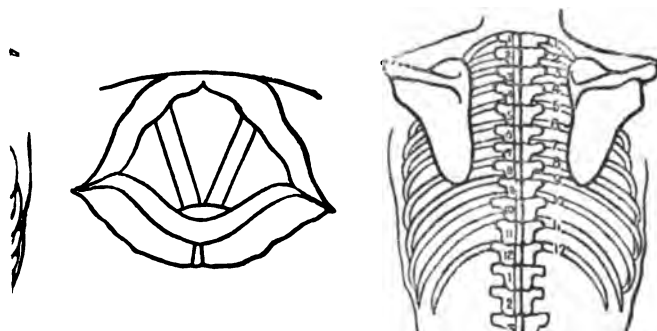
Finally, there would appear to be convenience in some form of accommodation for such advanced cases of the poor as have but little prospect of return to work, but are nevertheless likely to live for a considerable time. The same statement may obviously be made with reference to chronic malady amongst the poor.

But in the case of advanced pulmonary tuberculosis the consideration that under conditions of overcrowding and dirt, the disease may develop amongst other members of the family or tenement, and it is under conditions such as these that there is advantage and comfort both to the patient and his relations in his removal. It is, however, undoubtedly true that at the present time, especially in certain of our large cities, these advanced cases do, sometime prior to death, find their way in increasing numbers into the workhouses, where in some instances separate wards are set apart for their segregation. It may, however, be added that in the view of some persons there is need for accommodation of this nature through charities rather than those provided for the Poor Law, and it is urged that such accommodation could be provided elsewhere with no expenditure of money than is the case under the present Poor Law system.

ISH) to the _____ SANATORIUM
)

CONDITION ON DISCHARGE FROM SANATORIUM.						AFTER-RESULTS.
	Amount of work of which Patient is capable on discharge. Has he done work during stay in Sanatorium? (See Col. 6.)	Stage of disease on discharge (add whether arrested, quiescent, or progressing).	Weight on discharge (gaining or losing.)	Evening Temperature on discharge (mean of ten evening records).	Presence of expectoration and of Tubercle bacilli in sputum on discharge.	Furnish date and result of each inquiry made as regards patient since discharge. State, with reference to each inquiry, whether the patient is working, and, if so, nature of work and wage earned. If not working, how is he being supported? If dead, give date, place, and cause of death.
	14.	15.	16.	17.	18.	19.

OF LUNGS AND LARYNX ON DISCHARGE.



ich lung is involved), (R) + (L) if both lungs are involved.
cting at most one lobe. (R) and (L) as above.

amongst the consumptive poor, it is of importance that this Form
entered in the lower portion Column 19.

Clerk to the Guardians when the patient to whom it relates leaves
n is obtained, and from such information the columns in Return B

To follow Return A.

:-HISTORY of CONSUMPTIVE

**) alive (b) supporting themselves
nder-mentioned years. [Number
orting workers in column (b).]**

14	1915		1916		1917	
	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>	<i>a</i>	<i>b</i>

in each year, in cases where the

NOTE ON IMMEDIATE AND AFTER RESULTS OF SANATORIUM TREATMENT OF UNSELECTED CASES OF THE LEISURED CLASSES.

Dr. Noel Bardswell, Medical Director of King Edward VII. Sanatorium, has been good enough to furnish me with an advance proof of some valuable observations made by him during the last five years. The statistics refer to 278 consumptive patients treated by him in the years 1899 to 1904, inclusive, either at Sheffield, Banchory, or Mundesley. With the exception of 40 patients, all these 278 patients belonged to the leisured classes, and, with the exception of 17 working men who were treated in the Mundesley Cottage Sanatorium, they have been unselected cases.

The following table shows the condition of the patients when discharged, or what may be termed the immediate results of sanatorium treatment; and Dr. Bardswell states that the chief points to be noted in it are that—

(1) Of the 278 patients treated, only 29, or 10·4 per cent., failed to obtain any benefit at all.

(2) Of the 278 unselected cases, 78, or 28 per cent., were discharged with their disease completely arrested.

(3) Of these 78, no less than 66, or 84·6 per cent., were early cases.

(4) Of 92 early cases treated, 66, or 71·7 per cent., were discharged with disease completely arrested, and the remaining 26, or 28·3 per cent., were discharged in a condition not much less satisfactory, general health being completely restored in every case, the existence of a few adventitious sounds alone excluding them from the class of completely arrested.

(5) The average length of treatment of these 85 patients was 14 weeks.

(6) The results of the treatment of patients with somewhat extensive disease of fairly recent origin was much less satisfactory. Only 10 out of 97, or 10·3 per cent., had their disease completely arrested; 50, or 51·5 per cent., were discharged with their disease considerably, but still imperfectly, arrested, and with general health completely restored, the type of result with a fair prognosis and the remaining 37, or 38·1 per cent., were not sufficiently improved to warrant expectations of their ever completely recovering from their disease.

(7) The treatment of cases of chronic progressive disease of long standing is still more unsatisfactory. Of 66 of these cases treated, only 1, or 1·5 per cent., was discharged with completely arrested disease, and no less than 49, or 74·2 per cent., left with a decidedly unfavourable prognosis. The remaining 16, or 24·2 per cent., were discharged with a very fair prognosis, the disease being very considerably arrested, and general health fully restored.

Immediate Results of the Sanatorium Treatment of 278 Unselected Class of Pulmonary Tuberculosis.

Clinical Types.	Number of Cases.	Average duration of treatment in weeks.	Complete Arrest.	Incomplete Arrest. A.	Incomplete Arrest B.	No Improvement.
Acute milary ...	7	8	—	—	—	7
Acute caseous ...	14	14	—	—	2	12
Fibroid ...	2	10	1	1	—	—
Fibro-caseous Disease.	Early ...	92	66	26	—	—
	Fairly recent and extensive disease.	97	10	50	34	3
	°Chronic progressive disease of considerable duration.	66	1	16	42	7
	Totals ...	278	— {	78, or 28°/o	93, or 33·4°/o	78, or 28°/o
						29, or 10·4°/o

* Included in this 66 are 11 cases complicated by laryngeal tuberculosis.

Definition of terms.—*Complete arrest.*—General health completely restored in every respect, and lung disease completely arrested (apparent cure), there being no physical signs present, or only such as are compatible with a completely healed lesion.

Incomplete arrest A.—General health completely restored, but physical signs of lung disease, though much improved, not entirely cleared up, *e.g.*, perhaps limited to a few moist sounds on cough. *Incomplete arrest B.*—General health only imperfectly restored, and physical signs of the disease, *e.g.*, moist sounds, &c. still well marked.

Early cases.—Patients with early disease in one or two lobes only, and with little or no fever or other constitutional disturbance.

Fairly recent and extensive disease.—Patients with fairly recent active disease in two or more lobes with well-marked constitutional disturbances, *e.g.*, fever, &c.

Chronic progressive disease of considerable duration.—Cases of long standing disease with general constitution and recuperative power permanently damaged.

Note on After-results amongst the Leisured Classes.

The following table, which Dr. Noel Bardswell has kindly sent me, relates to the 278 cases, concerning which the "Immediate

Results" are furnished above, and which were treated during six years from 1899 onwards :—

Type.	Number of cases discharged after treatment.	Number of cases in normal health.	Number of cases in fair or poor health.	Died.	Lost sight of.
(1) Acute military ...	3	—	—	3	—
(2) Acute caseous ...	12	—	—	12	—
(3) Fibroid disease ...	2	2	—	—	—
(4) Fibro-caseous Disease.	(a) Early disease...	91	63	13	7
	(b) Fairly recent and extensive disease.	91	26	25	38
	(c) Chronic progressive disease of considerable duration.	61	6	12	43
	(c) Chronic progressive disease of considerable duration.	61	6	12	43
(4) Totals ...	260	{ 97, or 37·3%	50, or 19·2%	103, or 39·6%	10, or 3·8%

Eighteen patients died while in the sanatorium.

In connection with this table, Dr. Bardswell makes the following instructive comments :—

In the first place, I must say that by "in normal health" I mean that the patient is apparently cured, and able to do as much as any other normal person ; *e.g.*, if a man, he is engaged at his usual work, &c.

By "in poor or fair health" I mean to convey that the patient has not shaken off his disease ; he still has to make the care of his health his first consideration. Various types of cases are included in this category. There is, for example, the man engaged in business : his disease is incompletely arrested, but with shortened hours of work, an office with open windows, and a comfortable home, &c., he is well holding his own, and perhaps gaining ground.

On the other hand, this heading includes patients who are not able to do anything, *e.g.* patients continuing their treatment in sanatoria, at health resorts, or at home. Some of this group will remain, has they have been recorded for many years, viz. "in poor or fair health." Some have every chance of qualifying in time for inclusion in the first group, viz. "in normal health" ; others again, before long, will have to be classified among the deaths. I have previously noted that these statistics refer to the results obtained from the treatment of unselected cases. This is an important point to bear in mind when looking at the figures.

I must also again draw attention to the fact that, with the exception of 40 cases, all the patients treated belong to the leisured classes,

It is a matter of almost equal importance that the tables cover a period of 6 years' work.

The admission to paying sanatoria, now-a-days, are, in my experience, infinitely more hopeful than they were five or six years ago; the proportion of early cases is so much greater.

Thus it is, that the later or more recent the period that statistics date from, the better they will be.

My total of 278 patients includes the first six months' admissions to the Sheffield Infirmary (1899-1900) and to the sanatorium at Banchory (1900-1901). Both these institutions, when first opened, suffered from the usual handicap of sanatoria recently opened in districts hitherto unprovided with such accommodation, viz. the small proportion of favourable cases amongst those admitted. Amongst the first 30 patients admitted to the Sheffield Infirmary there were only two early cases, and fully 50 per cent. were hopeless, including several cases with miliary and acute caseous disease. My experience at Banchory Sanatorium, when it was first opened, was very similar. Patients in all stages of the disease were sent in, many, doubtless, as a forlorn hope; the limitations of the sanatorium treatment being, at that time, very imperfectly appreciated. I doubt very much whether admissions to any paying sanatorium will ever again include such a large proportion of advanced cases. The death-rate amongst these earlier admissions at Sheffield and Banchory has naturally been a heavy one, and this is reflected in my statistics. The result in my table, viz., that of 260 patients discharged after treatment 37 per cent. or 97 are now in normal health, and another 19 per cent. or 50 are in fair or poor health, are, I think, a fair index of my personal experience of the sanatorium treatment.

CHAPTER XV.

THE NECESSITY FOR THE "AFTER-CARE" OF PATIENTS
DISCHARGED FROM SANATORIA.

Year by year increasing prominence is given in many of the annual reports relative to sanatoria to the question of the "after-care" of patients discharged from these institutions, as will be seen by the accounts given in Part II. of certain of the institutions.

It is becoming more and more fully recognised that not a few patients discharged after a sojourn of three or four months at a sanatorium tend to relapse, and that their relapse is largely due to the fact of their inability to procure a *suitable* employment, their circumstances rendering a return to their former life an economic necessity.

Formerly it was thought by many persons in this country that a three months' sojourn at a sanatorium would result in the "cure" of the patient, and that ability to perform his former work was to a corresponding extent restored to him. But experience with the cases which in actual practice have in the past found their way into these establishments is accentuating the difficulty of finding suitable employment for the patients on their discharge.

It is desirable in the first place to furnish some illustrations from the annual reports indicating the concern which "after-care" is giving to the Committees and Medical Superintendents of sanatoria, and showing what a very large amount of consideration has yet to be devoted to the questions involved.

The sixth annual report relative to the Nottingham Sanatorium, which was opened in 1901, states, when dealing with the question of "after-care" :—

"It is known that some of our former patients, though presenting no signs of disease, are unable to find suitable work. In the struggle against tuberculosis in the poor this after-care is a matter of vital importance.

"It has always been pointed out that a stay of three or even six months in a sanatorium cannot do more than arrest or check the disease, which may break out again on return to the previous unhealthy conditions of life. A most careful life for a period of two years at least is needed before a 'cure' can be fairly spoken of. To the rich consumptive this is possible. We want to make it so to the poor."

Dr. Herapath Wood, in the first annual report on the Liverpool Sanatorium, in Delamere Forest, founded in 1901, remarks :—

"I fear we can scarcely be sanguine enough to expect that patients who, willingly or unwillingly, return to the dirt and foul air from which they have come, will escape relapses. Indeed, the complete object of such sanatoria as ours will not be fully effected until public opinion

adopts its leading principles and applies them to a greater extent than at present is the case to the conditions which surround the daily lives of the people."

In the first annual report of the Daneswood Sanatorium, founded in 1903, the following passage occurs:—

"With regard to the lasting cure, of the cases which leave the sanatorium as 'arrested' or 'much improved,' we desire to emphasise the importance of the after-care of such cases. If they are allowed to return to the same unsatisfactory and unhygienic conditions under which they originally developed the disease, there is no doubt that, even if arrested at the sanatorium, the disease will soon break out again."

"To effect a lasting cure an attempt must be made to wean them from the stuffy and ill-ventilated tailoring shops from which so many of them come, and to obtain for them, if possible, a more open-air occupation, even if this may mean, at the commencement, a certain diminution of income."

In the third annual report of the Leeds Sanatorium, which was founded in 1901, it is stated that:—

"The Committee feel it must be recognised that the best permanent results of sanatorium treatment cannot be obtained where the majority of the patients must return to unhealthy and poor homes. The problem of finding work for discharged patients has been occupying the attention of the Committee, but its solution is an exceptionally difficult one."

Dr. Esther Carling, Medical Superintendent of the Maitland Cottage Sanatorium, which has been in existence four years, writes in a paper of which she has sent me a copy:—

"Some discredit has been thrown upon the sanatorium treatment of the working classes on the ground that the good gained is only temporary, and that on a return to their ordinary life patients soon relapse. This discouragement arises from two causes, (1) unsuitable cases have been selected; (2) three months has been expected to do the work of two or three years. Let it be fully realised that consumption once established is not to be cured by a three months' course in a sanatorium. It may have been sufficiently arrested to allow the patient to return to some means of work, and, if at this point it were possible to employ him in some open-air colony under the eyes of the physician who had watched both his individual progress and had experience of many other cases, it is certain that many lives would be saved and success recorded to this system which are sacrificed because of the too sudden plunge to a long day's work after the enforced idleness and high feeding of the sanatorium."

In the first annual report relative to the Liverpool Poor Law Sanatorium, at Heswall, which was opened in 1902, Dr. David Smart and Dr. Nathan Raw, two of the medical officers, observe:—

"We are met with the fact that several of the patients on their discharge from the sanatorium are unable to find employment, and are consequently compelled to ask for relief again, not on account of bodily illness but because they are destitute."

In the same report Dr. J. Ernest Nevin, another of the medical officers, states:—

"As regards the future of patients, the speech of Mr. Malcolm Morris (Honorary Treasurer of the National Association for the Prevention of Tuberculosis), at the opening of the Heswall Hospital, represents the opinion of an expert. He said (extract from *Mercury*

report of the opening), 'after the patients were recovered from the first acute symptoms of the disease they (the guardians) had only completed one portion of the fight. They could not send the patients back immediately to the unhealthy slums, or another breakdown would be inevitable, and the patient would again be on their hands.'"

The Kelling Sanatorium (opened in 1902) report, relative to the second year's work at that institution, contains the statement that :—

"The comparatively large number of those classified as fit for light work who have relapsed is probably due to their having been obliged to do harder work than they were fitted to perform, and as this is a difficulty which must always be expected in dealing with the class of patients who pass through the sanatorium, it is not altogether surprising that some should have failed to maintain their working capacity. Stress of circumstances and the necessity of accepting any work which may be obtainable, often in most unsuitable surroundings, must have a harmful effect, and lead to much disappointment to those who have helped patients to meet the expense of sanatorium treatment. This seems to emphasize the experience that the healing effect of sanatorium life, unless supplemented by subsequent care and help, is often thrown away."

And a circular sent out in connection with the same institution urges that :—

"It is important to remember that the open-air treatment of the patient should not cease on leaving the sanatorium. Whether the disease is arrested, or the condition merely improved, it is essential that he should always continue the principles of treatment."

Similarly, another "notice" issued at the same sanatorium, states :—

"The patient, after the usual period of treatment, may feel quite fit for any work, but, we find by experience, it is almost always far better for them if he can continue his life in the open air for a further period, and in gradually relaxing the discipline of sanatorium life and increasing the amount of work he does, slowly accustom himself to the conditions to which he will ultimately have to return."

In the annual report on the Devon and Cornwall Sanatorium, opened in 1903, the Medical Superintendent observes :—

"The figures of after-results are by no means good. The chief cause is that the patients delay coming until the disease is far advanced, so that even if they can be brought to the stage of relative cure by sanatorium treatment, the strain of returning to their old surroundings is too much for them, and they break down again."

"The results point to the importance of the two questions referred to before, the discovery of early cases and the formation of a colony or other means of taking care of patients after leaving."

The annual report of the Bowdon and Crossley (the latter opened in March, 1905) Sanatoria contains the following statement :—

"Whilst the good results obtained by the treatment of patients both at Bowdon and Delamere are quite equal to those met with, not only in sanatoria in this country but also on the Continent, the Medical Board regret to record that after a short interval they see the patients only too frequently relapse into their former condition. They are confident that this occurrence cannot, to any great extent, be due to re-infection, since in Manchester more particularly it is customary to disinfect the homes on the removal of the patients to the sanatorium."

"Nor is it to be supposed that the patients, so soon after their discharge, can have disregarded the advice so carefully and persistently given to them during their stay at the sanatorium and at the time of leaving. The patients know the necessity of continuing the same hygienic measures to which they have learned to adapt themselves at the sanatorium, viz., to sleep with open windows, to keep their living-rooms well ventilated, to destroy their sputum, &c., so that it might be inferred that the ill-effects which show themselves so rapidly in these patients on returning to their homes are mainly to be attributed to the unhealthiness of their occupations or the poverty of their circumstances."

"It is, therefore, a great desideratum that something more should be done for suitable selected patients after leaving the sanatoria."

Additional illustrations of the same tendency could easily be furnished. But the foregoing extracts suffice to indicate that serious question will not to be raised as to the need, alike in the interests of sanatorium treatment and of the lives of the patients discharged therefrom, for doing all that can be done to place such patients under the most favourable conditions for the prolongation of their lives and the restoration of as full a measure of money-earning capacity as is practicable.

It will have been noted that certain of the reports ask for what is, in effect, sustained medical surveillance, and for selected work for a period of as much as two years.

It must, however, be remembered that the duration and quality of the "after-care" depends in a supreme degree upon the class of case sent to any given sanatorium, and upon the amount and nature of the work (if any) which the patient has been able to carry out daily during the latter part of his sojourn in the institution.

In dealing with the question of the statistical returns for the several sanatoria, it has been pointed out that the terms "fit for work," "fit for light work," "fit for suitable work," are now and again employed in the absence of any test having been made of the actual working power of the patients.

In other sanatoria, however, such, for instance, as the Brompton Sanatorium at Frimley, the Manchester (Crossley) Sanatorium in Delamere Forest, and the Kelling Sanatorium in Norfolk, the patients are employed in such fashion as to impart a very material value to the terms as to capacity used in regard of the patients discharged.

At the same time the fact must not be overlooked that work such as is undertaken under Dr. Paterson's supervision at the Brompton Sanatorium is rendered possible solely by the circumstances that the cases are, as a general rule, sent down from the parent hospital at Brompton after they have, by a sojourn of at least a month in that institution, evinced a favourable reaction to the modified open-air treatment which is there practised.

It is probable, indeed, that the need for "after-care" so fully exemplified in the foregoing extracts is but another method of expressing the difficulty, in actual practice, of obtaining sufficiently early cases for admission into the sanatoria of this

country. Were it practicable for all sanatoria to obtain thoroughly *suitable* cases (and it may be added this term implies much more than the term *early cases*), the demand for "after-care" would be much less manifest than at present, owing to the fact that ability to do a full day's work might be demonstrated at the sanatorium prior to the discharge of the patients.

But as it is necessary to deal with the conditions which actually obtain, it will be desirable to devote a separate chapter to consideration of what is being done, and what is being advocated, with the view of improving existing conditions in the matter of "after-care."

As, however, this question of "after-care" is intimately bound up with that of the employment of patients while at sanatoria, the two questions may usefully be discussed under one heading. It is obvious that if the patients can be discharged from sanatoria after having *demonstrated*, while still within the institution, their ability to perform a full day's work, there is far less need for "after-care" than in cases where no such test has been practicable, and when the patients have only been able to stay for, say, three months at the institution. In some instances this very "after-care" can be carried out at the sanatorium itself; in other instances provision must be made for subsequent "after-care," the question being very largely governed by the length of stay and the possession of adequate ground and opportunities for work in connection with sanatorium.

CHAPTER XVI.

ON THE EMPLOYMENT OF PATIENTS WHILE WITHIN SANATORIA, TOGETHER WITH THE EXISTING AND PROJECTED PROVISION FOR THE "AFTER-CARE" OF PATIENTS DISCHARGED FROM SUCH INSTITUTIONS.

It cannot be said that any complete and wide ranging scheme has yet been evolved for fortifying the powers of resistance to phthisis of discharged patients. The need, however, for some such scheme becomes, as has been shown in the previous chapter, more and more apparent as experience of sanatorium treatment in its relation with the working classes of this country increases. This need is due, in the first place, to the fact that a considerable number (*see*, for instance, the figures relating to the Liverpool Guardians, the Hull and East Riding and the Bradford Guardians Sanatoria) of the discharged patients tend towards relapse—*i.e.*, to such a weakening of their powers of resistance as to favour in their bodies renewed activity of the parasite of tuberculosis lying dormant in their tissues; a tendency which is greatly enhanced if the patients are compelled to return at once to the conditions under which they developed their malady.

Need in the above sense is also due in some, perhaps in an increasing, measure to the circumstance that there is, at times, difficulty in securing any sort of employment for persons who have recently been discharged from a sanatorium.

This difficulty is to be explained partly by the fact that dread of infection from phthisical persons is a growing influence.

As an illustration of this aspect of the question, it may be recorded that Dr. Jane H. Walker, who has had a very extensive experience of sanatoria for the working classes, stated in the January (1906) number of "Tuberculosis," when dealing with the subject of "The Employment of Consumptive Patients" :—

"I frequently find that employers, who are charity itself in paying for clerks or servants, will not take back their employes even when I can guarantee them fit for work. They talk of the risks of infection as if a patient in whom the disease is completely arrested was a sort of focus for the dissemination of germs. A very sensible man, one of my recent patients, asked to be allowed to leave before his time was fully up, because, as he truly said, no one would entertain an application for work if the applicant wrote from a sanatorium.

"Another patient, a domestic servant who had left me quite cured, was some months after discharged at a moment's notice because her mistress discovered that she had once been at a sanatorium. . . . It is not enough to save a patient's life if he has lost his means of living. I find the greatest reluctance on the part of most shops to employ ex-patients, and I can never get help locally for my discharged consumptives."

This obstacle through fear of infection and the advisability therefore of persons not applying for work while inmates of a sanatorium has been brought to my notice elsewhere. It arises in large measure from exaggerated estimate of the danger of infection.

In this connection, Dr. M. S. Paterson, Medical Superintendent of the Brompton Hospital Sanatorium, Frimley, and Dr. F. C. Shrubbsall, Resident Medical Officer of the Brompton Hospital, stated in the "Lancet" of July, 1906.*

"The extreme popular view of the contagiousness of consumption, with the naturally associated tendency to treat all sufferers as lepers is unjust, unwarranted, and an economic error. It may be that the disease in any individual has been arrested, that he has no expectoration, or, if any, that it has, by repeated examination, been found to be free from tubercle bacilli; such a person could with safety to others be sent to work in any surroundings."

Again an interval between sanatorium treatment and resumption of everyday work is called for owing to the belief or suspicion that a consumptive person who has during recent months spent a considerable portion of time in rest and recreation at a sanatorium is not likely at once to adapt himself with enthusiasm to an amount of work which he may perhaps reasonably feel is prejudicial to the prolonged retention of his regained health. As to this point, the article by Dr. Walker already referred to states that "Men easily get accustomed to doing nothing, and become so very careful of their own health that when they leave they are often more or less unfitted for real work."

Dr. Noel Bardswell, Medical Superintendent of King Edward VII. Sanatorium, who has taken a great interest in this question, quotes in his recent work† the experiences of Mr. W. J. Fanning and the late Mr. L. D'Oyly Carte, who themselves have had quite a unique opportunity for correctly gauging public opinion on the subject. When referring to replies received from employers of labour in response to a circular sent out by the Kelling Sanatorium After-Care Committee, these observers add :—

"A large firm of nursery gardeners declined to consider the taking on of any consumptive labourers, on the ground that their presence would have a bad effect upon the other men, owing to the consumptive labourers having lighter work reserved for them. They argued that the consumptives would be bound to take things somewhat easily, and that in consequence the work generally might tend to become slack."

Also it has to be borne in mind that the length of residence at a sanatorium is, as a general rule, too short to allow of anything approaching permanent restoration of health in cases other

* "A few suggestions for the future of consumptive patients of the working classes."

† "The Consumptive Working Man. What can Sanatoria do for him?" by Noel Dean Bardswell, M.D., M.R.C.P., F.R.S. (Edin.). The Scientific Press, Limited, London, 1906.

than those which were in quite the early stage of the malady and therefore most suitable for treatment.

Under existing circumstances there is an undoubted difficulty in obtaining a longer sojourn than three months at a sanatorium, a period which is probably, in the majority of cases, insufficient to promote an absolute arrest of the disease.

The evidence of Dr. Bardswell is to the following effect :—

“ To cure a consumptive with disease only in its earlier stage it is necessary for the individual to live at the highest possible level of physiological fitness for a very long time, how long it is difficult to say, but twelve months is certainly within the mark.

“ When the disease has gone beyond its early stages the time required for effecting the cure is very considerably lengthened. Herein lies the difficulty in dealing with consumption, and so it must remain until its specific cure is found. Other things being equal the prognosis in the case of the consumptive leisured classes is infinitely better than that of the consumptive poor. The former can afford to continue their treatment for as long as is necessary, whilst the latter after a few months in a sanatorium have usually to return to the same conditions under which they contracted their disease. If these conditions, especially with regard to work, are satisfactory, the outlook for the future may be good enough, but when they are bad the possibilities of relapse are considerable.”

The procurement of suitable employment after leaving the sanatorium involves in a very large number of cases, even supposing suitable work can be secured, change from an urban and perhaps sedentary occupation to a rural and physically active one; a change which, in many cases, may entail a very materially lower wage than the patient has formerly been in receipt of, even if, on discharge, the patient is “fit for work” in the fullest sense of the term, *i.e.*, is competent for the performance of an amount of physical labour to which he has hitherto been unaccustomed. Such lower wages may conceivably not suffice to maintain the patient and his family in a condition of full physical efficiency, and what this may mean to the phthisical person has been made apparent in Chapter IV.

As stated by Drs. Paterson and Shrubsall,

“ No amount of fresh air during work will compensate for the lack of sufficient nourishing food and bad accommodation during the rest of the day. There is a certain tendency to forget that starvation is a more serious trouble than tuberculosis.”

Dr. Bardswell also says as to this point :—

“ The provision of suitable employment is a very difficult matter. To begin with one must bear in mind that no employment, however healthy and open-air its character, is suitable unless the income a man can earn at it brings him in a sufficient sum for his proper maintenance. This fact is one which, I think, is not sufficiently appreciated. Personally rather than send a man back to such conditions of work as will give him an inadequate income, I would advise him to return to an indoor and possibly even an unhealthy occupation at which he can with certainty earn a living wage. In the case of unmarried men, a change of employment entailing even a considerable loss of income is often quite advisable, for physical efficiency can usually be maintained by a single man on a wage of from 15s. to 20s. a week, a sum quite inadequate for the

needs of a man with a wife and family. To judge from my own experience change of employment usually means some loss of weekly income; on the other hand a return to unhealthy employment must be associated with risk of subsequent relapse. One finds that patients for the most part fail to make a satisfactory change in their employment, and that the majority in consequence return to their original trades or work. This can be easily understood. It is hard enough for the sound unemployed to get work in many instances, and even a healthy man usually finds it difficult to obtain a situation or work to which he is quite unaccustomed. The labour market for consumptive working men in short is a very restricted one, unless philanthropy rather than strict commercial interest regulates it."

Further, there is the fact that some at least of the patients at sanatoria tend to acquire what has been termed a "sanatorium habit" and become "work-shy"; though possibly the presence or absence of this habit depends largely upon the moral tone prevailing at any given sanatorium, as also by the type of cases which find their way into the institution.

Patients with any chronic illness, and more especially perhaps with pulmonary tuberculosis, tend to become introspective and auto-concentrative, and such tendency is certainly accentuated by the period of idleness at a sanatorium. Persons who are constantly raising questions with themselves as to whether such and such a physical act is good for the malady from which they suffer, are not likely deliberately to overwork themselves on first leaving a sanatorium.

In a "Home for the Dying" work is impracticable and discipline is a matter which to some extent must depend upon the physical condition of the patients. In a sanatorium, on the other hand, containing *early* and *suitable* cases, properly regulated exercise, directed into channels which may augment the earning capacity of the patient in a physical sense on his discharge, is not only practicable but necessary if sanatoria are to yield the best economical or even humanitarian results. Nevertheless there is the fact that for a person long accustomed to sedentary occupation the performance of such work as a full day's agricultural labour is not a task likely to be undertaken with impunity or to be performed to the complete satisfaction of the employer. Heavy agricultural work, moreover, is to be deprecated for persons in whom hæmoptysis has been at all a prominent symptom or where the disease cannot be regarded as either "cured" or "arrested," a class of patient numerically abundant as has already been seen in the chapter dealing with sanatorium statistics.

Tasks such as prolonged digging in a heavy clay soil, of manure carting or of carrying heavy sacks, involve an altogether undesirable strain upon the pulmonary circulation of a person whose lung lesion is extensive, and it is not infrequently found in practice that inability to perform with safety, even at wide intervals, occasional tasks of this nature, has deterred patients from accepting employment which might otherwise have been well within the compass of their powers.

This employment difficulty in connection with the sanatorium problem is fully recognised at most of the existing sanatoria. But, unfortunately, it has not as a general rule been found practicable to accomplish as much as could be wished while the patients remain at the sanatorium itself in the matter of systematic work or training. So many patients are in a relatively advanced phase of the disease when they reach the institution that they are in need of rest rather than of exercise. There is, too, the important fact that patients are frequently unable to find the funds or to spare the necessary time, even if their personal expenses are defrayed, to attain a state of improvement enabling them to undertake day by day, while still in the sanatorium, anything approaching to what may be termed full day's work. Moreover, patients coming from a sanatorium where more or less advanced cases gain admission, are apt to view with surprise and even with suspicion a proposal to undertake work.* They labour at times under the misconception that if they pay, or have paid for them, even a mere pittance they cannot reasonably be expected to work. Be this as it may, there is the undoubted fact that it is often a difficult matter to persuade the patients to undertake work of any description.

Notwithstanding difficulties of the above sort which are only too common, experience is growing of what may be practicable under some more systematic scheme of rigid selection of cases in *suitable* condition for treatment at sanatoria. Thus:—

At the Brompton Sanatorium there is in vogue, as a result of the foresight of Dr. Paterson, the Medical Director, an elaborately developed system for employment of patients. In drawing inferences, however, from the circumstances obtaining at this institution it is important to remember, as has already been said, that in consequence of the method of selection practised at the central hospital in London, the patients transferred to this sanatorium are for the most part those who have already shown a favourable reaction to the preliminary treatment there carried out. Dr. Paterson classifies the patients into seven different groups for the purpose of exercise and work.

The lightest form of prescribed exercise for patients consists of walks for specified periods along what is known as the "measured mile," a walk through the pinewoods which is well sheltered throughout. If these exercises are performed without detriment, the patient is allowed, after a time, to collect firewood or to undertake some equally light work, such employment forming the second grade of occupation. In the third grade patients are allowed to carry baskets of firewood or some other light substance to a given place; while in the fourth grade the weight to be thus carried is gradually increased, and consists

* Not a few patients, it would appear, have been inmates of more than one sanatorium, and some of these persons seem to have developed decided views as to regulation of their own conduct in institutions.

of material of a nature to assist any work which may be in progress at the institution at the time. The fifth grade, to which such patients who undergo grade four with impunity are transferred after a time, consists of digging operations in already *broken* ground; while in the sixth grade the patients deal with *unbroken* or virgin soil. In the seventh and eighth grades the patients are employed in relatively hard work, involving use of spade, pickaxe, etc., as for instance in making paths through the woods.

The patients work on an average some four and a half hours daily, and are kept at work practically during all weathers, being not allowed indoors except for meals and rest until 7 p.m. During the fortnight prior to their discharge from the sanatorium patients are engaged in work for six and a half hours daily in order that their capacity for labour of average severity may be duly tested before they leave the institution.

Patients are retained in this Brompton sanatorium for the time necessary to produce as satisfactory results as practicable. To persons who wish to leave the institution in order to maintain their families, Dr. Paterson explains that it is far better, if necessary, that the whole family shall seek temporary refuge in the workhouse than that, by too early discharge from the sanatorium, both the patient and his family may find themselves more or less permanently under the protection of the poor law.

Again, at the Bradford Poor Law Sanatorium Dr. Luard has been able, after some difficulties overcome, to inaugurate a scheme of work. But the class of patients sent to this institution is not as well suited to undertake employment as patients of grades above the pauper class.

Dr. Luard, in the August (1906) number of the English periodical "Tuberculosis," makes some instructive comments on the result of his experience. After referring to the good results of employing at the institution certain patients who had suffered from hæmoptysis, he says :—

"These few cases, I think, do show that even hæmorrhagic cases need not *necessarily* be debarred from active spade work, and I need hardly point out that if a man is ever to return to active labour it is far more safe and suitable for him to do so in a sanatorium gradually, under the eye of his physician, who can test his powers by experience, than that he should be suddenly shot out into the world of ten-hours a day labourers to work full time in competition with perfectly healthy men. It is no wonder that sanatorium "cures" under such conditions only too frequently break down and become "work-shy."

"In conclusion I should like to record my opinion that outdoor work in a sanatorium cannot be expected to "pay" in a commercial sense, for some of my friends and patients have been inclined to draw a very imaginary picture of sanatoria entirely self-supporting through the labour of patients.

"To put it in a nutshell. The cost of each patient per week here (Bradford Guardians Sanatorium), including interest on original outlay and establishment charges, is, I believe, about £2 3s. 6d. Suppose the weekly wages of an agricultural labourer to be £1, working ten hours a day. Now a sanatorium patient, working three hours only (not to

mention half holidays), would, even if his work during those hours was equal to a sound labourer's, be little more than one quarter, or 6s. a week; and in most cases, as he works with ample pauses at a slow rate, it would hardly be worth half that sum. These considerations, I think, dissipate any idea of sanatoria becoming self-supporting on these lines."

The weekly cost per head at the Bradford Sanatorium referred to above is, owing to the repayment of the original loan, a somewhat high one at present. It may however be mentioned, in passing, that the cost per head at the Liverpool Poor Law Sanatorium during the paying off of the loan raised for construction amounted recently to nearly £3 weekly.

At the Northwood Sanatorium Dr. Kelynack has introduced a system by means of which he hopes to gradually accustom suitable patients to an increasing amount of work in order that they may not after their discharge undergo relapse in consequence of what would otherwise be likely to prove a too sudden change of habit and environment.

All patients are encouraged by him to assist in the performance of light work, and shortly before their discharge efforts are made to secure them suitable occupations so as to reduce to a minimum the chances of relapse.

At Malting's Farm Sanatorium, Dr. Jane Walker has found some difficulty in inducing the male patients to work in a systematic fashion, owing largely to the fact that the patients themselves fail to appreciate the importance of becoming reaccustomed to work before leaving the sanatorium. Basket-making has been attempted; but the results of this work are found somewhat unsatisfactory, as the men who have in a sense mastered the art leave the sanatorium, and the work as a consequence is relegated to persons of less experience. The account under poultry farming at this establishment, however, shows, although this industry is also beset with difficulties, a small balance.

As regards the female patients, a lady sub-gardener and manager of industries has been appointed. Among other matters she is able to teach patients pillow-lace making; and the sewing of plain linen for a London firm also provides employment. The sanatorium is willing to take more work of this character.

Dr. Fleming, Medical Superintendent of the Devon and Cornwall Sanatorium, writes that owing to the advanced nature of the cases which are sent to this sanatorium it has not hitherto been practicable to devise any system of educational work. Recently, however, he has induced certain patients to work two hours daily, although he has experienced some difficulty in providing enough work for them within the sanatorium grounds. It has not been found possible to organise any system of "after-care" here; but certain of the boards of guardians sending patients to the institution make, it appears, a small allowance to patients of their own on leaving the sanatorium. Further reference will be made later on to the utility of such an

allowance. As Dr. Bardswell states in his "Consumptive Working Man":—

"One has seen a good many instances in which an allowance of 10s. to 12s. a week for the first few months or so after discharge has made all the difference between ultimate success and failure."

As regards the actual "after-care" of patients subsequent to discharge from sanatoria, although a great deal is being contemplated in the present, and though something is to be hoped for in certain directions for the future, there is but little that is satisfactory to be recorded from the annual reports of the several sanatoria.

The sanatorium which perhaps has made the most systematic attempt in this direction is the Kelling Sanatorium in Norfolk, where Dr. Burton-Fanning of Norwich has, with the co-operation of Dr. W. J. Fanning, Medical Director of the institution, devised a scheme, of which the following is an outline.

An "after-care committee" has been appointed by the governing body, and one of the steps taken by them is to issue a leaflet (of which a specimen will be found in the Kelling report later on) addressed to "employers of labour and others interested in the working-class consumptive."

In this leaflet it is explained that sanatorium treatment is only the first step towards cure; that although a large proportion of the early and suitable cases are on discharge recorded as "fit for work," it is essential, if the good that has been gained at the institution is to be maintained, that the patient should, on leaving, pass to suitable employment and surroundings. Also, it is pointed out that although work of a suitable character is found in the sanatorium itself for a small number of patients, there is necessity that, if the scheme as a whole is to be a success, employers of labour should render assistance:—

"1. By being willing now and then to find temporary light work for a man.

2. By occasionally giving one of our men the chance of a suitable permanent position.

In the first case the idea would be to enable the man for a short time to earn a bare living wage in suitable surroundings while he looked about for permanent work, and in the second to provide him, at, no doubt, a moderate wage, with suitable permanent employment.

Our men are almost all skilled in some trade, and we would obtain in every case a character from a previous employer.

It would be clearly understood that no responsibility whatever as to the man's health should be undertaken by the new employer; if a man so employed should break down, the Committee would like to be informed and would do all they could to secure him further treatment.

The employment may be either out of doors or in pure air indoors. It should not involve any great physical effort, nor should it require to be done against time or at high pressure.

The following list contains a few of the employments suggested:—

Light work about a farm or garden.

Driving.

Caretaking.

Agency work, as, for instance, insurance agency, rent collecting some forms of travelling, &c.

Clerical work if in good condition.

Estate work, such as light carpentering, looking after an engine, &c.

Motor car driving.

Check taking.

Doorkeeping and many others.

The risk of infection has been mentioned as an objection, but there is no doubt that it has been greatly exaggerated, as, in any case, it is certain that a man who has been treated at a sanatorium, whose symptoms have disappeared, and who has been taught the proper precautions, is not only unlikely to be a source of infection, but is actually a missionary of health to all with whom he comes in contact.

The preferential consideration given to subscribers with respect to the admission of patients into the sanatorium will be given to any employer who will consent to give, instead of a subscription in money, this invaluable practical aid."

As regards the employment actually provided for inmates of the Kelling Sanatorium, it may be mentioned that in 1906 there were six patients continuously engaged in work at the institution, employment in this manner being viewed as a great privilege on the part of the patients in that it afforded them; (a) a further prolonged course of treatment free of charge; (b) opportunity of gradually getting back into full work; and (c) time and opportunity of finding permanent employment elsewhere while still under medical supervision at the institution. The principles which govern selection and employment of patients under this scheme are:—

- (1) That only suitable cases and persons likely to obtain permanent benefit are eligible.
- (2) That there shall be the following graduated scale of remuneration:—

5 hours a day work for 2s. per week.
7 " " " 3s. 6d per week.
Full day's work for 5s. per week.
- (3) That the working patients must do any work they are asked to perform, and remain meanwhile entirely under the control of the Medical Superintendent.

The actual cost of each working patient to the sanatorium, after deducting the value of the work done, is estimated at 15s. 6d. a week. Expenditure in remuneration of patients is only regarded as justifiable in that it materially assists the object of the institution.

A poultry farm has been started here with the view of rendering some of the employment as remunerative as possible, and recently the trade of basket-making has been introduced.

Taking, however, a broad view of the problem, there can be no question that the subject of the "after-care" of patients discharged from sanatoria must be approached in a more systematic fashion than has hitherto been the case, if the *maximum* of benefit from sanatoria is to be secured to the patients dealt with therein.

In a certain sense this problem may be regarded as occupying a position not widely different from that presented by the "unemployed." Phthisis patients and unemployed workmen are, broadly speaking, alike members of that great relatively unfit body whose labour, for one or another of a plurality of reasons, is not of a highly remunerative order. At the "labour colony" there are found samples of the wreckage of life, and each unit in such wreckage seems to require, as it were, separate and individual treatment. Whatever the aggregate potentialities of such colonies, not a few of the inmates are of a class that will always require something approaching hot-house treatment. And so with sanatorium inmates.

It would obviously be unreasonable, and probably uneconomical, to neglect to organise a system of "after-care" on the ground that institutions or establishments intended for reception of recently discharged patients are not likely to prove either remunerative or even self-supporting. That the "after-care" of patients who have been discharged from a sanatorium where no definite routine work has been carried on may prove to be unremunerative is clearly a matter of very great probability.

The facts so far available would seem to suggest that in sanatoria where for one or another reason early and suitable cases have been systematically secured, and where a well thought out and well supervised scheme of gradually increasing employment of inmates has been devised, patients on discharge (assuming that they have been at the institution a sufficient length of time) will, many of them, be able at once to undertake work of any average degree of severity. For these persons "after-care" in an institution for educational or even transition purposes would not seem requisite; that is to say, if the patients are able to secure *suitable* employment.

It is, however, quite otherwise in the case of institutions which have had to admit the heterogeneous cases which so often present themselves for treatment. For the bulk of such cases a full day's work is practically out of the question, and it is for cases in this category, unable to remain in the sanatorium sufficiently long to re-acquire full working capacity, and whose condition holds out hopes of permanent improvement, that "after-care" establishments are really essential.

The difficulties in arranging for the "after-care" of patients discharged from sanatoria are dealt with by Lieut.-Col. E. Montefiore of the Charity Organisation Society in the August (1905) number of the English periodical "Tuberculosis." His representations relate to several quite distinct sanatoria, and they are of corresponding considerable value. He says :—

"The problems which arise to puzzle those who endeavour to assist the phthisical patient of the working class are very intricate and vexing, and their solution in nearly every case is difficult and in some cases almost impossible."

"Those charitable workers who have sent people of this class to open-air sanatoria have experienced disappointment at the result, and I believe the disappointment was due to the fact that they expected too much for their patients from a stay of a limited period—say three months—at a sanatorium. They forget that the patients had not applied for help until the disease had obtained a firm hold, and had undermined their constitutions to such an extent as to prevent their recovery, notwithstanding the bracing effect of the open-air life which they have led: or, if owing to the sanatorium treatment their disease had become quiescent, the fact of their having to return to the occupations which have formerly been so deleterious to them had not been sufficiently considered."

Col. Montefiore refers also to the results obtained by Dr. Burton-Fanning at Kelling and Mundesley Sanatoria, the one for poor patients, the other for persons better off; results which certainly tend, so far as they go, to illustrate the enormous importance of "after-care." Dr. Burton-Fanning observes:—

"With better selection at Kelling a large proportion are returned to fitness for work. On the other hand in one year one witnesses as many Kelling patients fall away as occurred in two to five years with our Mundesley patients. Our Mundesley patients were drawn from the affluent classes and could afford to adapt their work and their conditions to the requirements of their health. Our Kelling patients, on the other hand, were poor, and found themselves perhaps obliged to accept work which was prejudicial to their health, and suffered privation from inability to obtain suitable employment. I am convinced that, so far as the poorer classes are concerned, our chief task commences after their recovery has been completed. It is comparatively easy to arrest the disease, we only require early diagnosis, but the prevention of relapse is a different matter. . . . Impressed by these facts the Kelling Sanatorium now directs its attention towards securing suitable conditions for its patients on their discharge."

Colonel Montefiore furnishes also the experience of the Medical and Convalescent Sub-Committee of the Charity Organisation Society relative to 363 applications sent to headquarters by the District Committee for admission to sanatoria. These proposed patients were submitted to medical examination, and as a result the total 363 was reduced to 140, or 38·56 per cent. of the applications, the usual reason for rejection being the chronic or advanced nature of the malady. During 1903 and 1904, 106 (carefully selected) phthisical patients were sent to sanatoria (54 men and 52 women), and the condition of these patients on June 20th, 1905, *i.e.*, from six to 30 months after discharge, was as follows:—

- 11, or 10·38 per cent. (5 males and 6 females) were dead.
- 7, or 6·60 per cent. (2 males and 5 females) had not replied.
- 24, or 22·64 per cent. (10 males and 14 females) were unfit for work.
- 64, or 60·38 per cent. (37 males and 27 females) were well and fit for work (full or light).

Figures relative to the after history of the 64 patients fit for full or light work would be interesting, more especially if a return of the previous work and of the money earned by each individual could be also furnished. Similarly it would be instructive to determine the actual cost of the sanatorium treatment and that of maintaining their families (if any).

Colonel Montefiore notes that in many instances the "after-care" of patients is extremely difficult; as, for instance, in cases where a patient is an expert in regard of a single part of a particular trade, such as "trouser pressing," or in one section only of the "boot making." It is, Colonel Montefiore states, "almost ridiculous to think of moving such a person into the country and of finding him work there which will be sufficiently remunerative to support him."

He furnishes instances showing both the failure and the success which has attended the work of the Charity Organisation Society in relation to phthisical person of the poorer class :—

"The open-air treatment of the phthisical poor may have disappointed many charitable people, has made some of them express views of despair on the results obtained, and has even made them think that as the expenditure of time, trouble, and money involved is so great, that these cases should be relegated to a society which would make the care and supervision of them its special object."

He thinks, however, that encouragement to persevere may be found in cases such as the following :—

T. 106, 26 years of age, private in the Royal Marine Light Infantry. Went to Kelling Sanatorium on November 24th, 1903, and returned on March 12th, 1904. The doctor at the sanatorium reported that "this patient keeps in a satisfactory condition as to his chest, the lesion being quite a small one, but he is worrying a good deal about his home affairs. I think if some light work out of doors could be found for him it would be a good thing." On June 20th, 1905, his Committee reported that "this man started from England on June 30th, 1904, for Ontario, Canada." . . . "He is doing good work and is much liked in the colony. He hopes soon to have his wife and children with him."

The work of the Charity Organisation Society must, in a sense, be regarded as confined largely but not entirely to the relatively unfit, those who from various causes have been unsuccessful in the struggle of life. But they represent a class which, Colonel Montefiore regards as probably a degree higher in the social scale than the casual pauper class; it may in fact be assumed that to some extent the Charity Organisation Society intercepts the worker on his way to, and frequently saves him from, actual pauperism. It is also important to note that before a patient is recommended for a sanatorium by the District Committees, such Committees endeavour to satisfy themselves that the family of the patient will be meanwhile at least partially cared for by his friends. If this cannot be done and if the total cost of maintaining the family would devolve upon the Committee, the patient in question would not be regarded as "suitable" for sanatorium treatment. The Charity Organisation Society cases represent, therefore, a class concerning which family assistance in some degree is feasible; they are not, that is to say, destitute of relatives and friends having ability to help them.

For each patient sent to a sanatorium by the Charity Organisation Society the District Committee pays 15s. weekly, the remaining 15s. (the usual payment is 30s. weekly) is provided out of the central funds. Only such cases are admitted to sanatoria

as are considered by one of the physicians to the Brompton Hospital for Consumption, Dr. J. J. Perkins, who is conversant in an exceptional degree with the tuberculosis problem, as suitable.

In practice only patients in the *incipient* stage of the disease are accepted for sanatorium treatment, and they must agree to remain at the institution as long as the medical officers of the sanatorium consider necessary. Moreover—

“The District Committee must be prepared to raise sufficient money to allow the patient to remain at the sanatorium for as long a time as the medical officer may deem advisable (which will probably be not less than three months), and to assist the family when the patient is the bread-winner.

“The District Committee should, as far as possible, consider the after care of the patient, the suitability of his occupation, the removal of the family from insanitary surroundings, in some cases their migration to the country, and should as far as possible keep in touch with the patient after he leaves the sanatorium.”

Thus, not only are Charity Organisation Society cases *selected* in a medical and in a social sense, but they are persons concerning whom provision is made for a prolonged stay at the sanatorium, for whom efforts are made to encourage their “after-care,” and the families of whom are, so far as may be practicable, sufficiently supported during the absence of the bread-winner.

The statistics relative to Charity Organisation Society cases are therefore not without considerable value as an indication of what is practicable.

It will be clear from what has been said that there is much need generally for a further development of machinery for maintaining under existing conditions the patient's family while such patient is undergoing treatment. It is probable that greater success would attend sanatorium treatment as a whole were it possible to place the mind of the patient in a relative state of tranquility with reference to the maintenance of his or her family. It is in large degree owing to the difficulties encountered in maintaining their family that patients are often compelled to leave the sanatorium before they have regained their working capacity, or the condition of their lungs has mended sufficiently to render the improvement likely to be permanent.

It is in this sense that the German system of Compulsory Insurance renders invaluable aid; and in this connection Chapter XXIII., in Part I. of this report which deals with the German Insurance System as it affects the treatment and prevention of tuberculosis will be found of particular interest, as also will Chapters I. and II., in Part IV.

Dealing broadly with this question of “after-care,” it would seem that if the maximum usefulness is to be derived from sanatoria, a scheme or series of schemes somewhat on the lines as those adopted with the London unemployed may be necessary: a consideration which was impressed on me during a visit to the

Hollesley Bay Labour Colony, near Woodbridge, in Suffolk,—a colony which was inaugurated as a result of the public spirited policy of Mr. Joseph Fels, by whose instrumentality an estate of 1,300 acres of land, 500 arable and the rest pasture, has been acquired.

Naturally a colony for patients convalescent from pulmonary tuberculosis would need special equipment and administration. But there are certain features in connection with the colony at Hollesley Bay which serve to indicate what might, on experience, be found practicable, in dealing in the way of "after-care" with consumptive patients.

One of the objects at Hollesley Bay is to provide sufficient and continuous work for men who are not only in exceptional need of employment, but who have already either lived upon the land or have shown a marked aptitude for country life. So far as phthisis patients are concerned, it is assumed that such aptitude would have been demonstrated while the person was still at the sanatorium.

The work at Hollesley Bay under the above heading is divided into what are termed two stages. The first of these stages is a probationary period of some three months, during which the men live in the previously existing college building, which might not inaptly be regarded as a sanatorium, while their families are supported in London.

During the second stage, if the first stage has proved satisfactory and the families of the workers are regarded as desirable, the wives and families of the men are brought down to the colony and housed in cottages for a period of six to nine months. These cottages have been constructed on very much the same lines as dwellings erected at the Garden City at Letchworth. An ultimate aim at Hollesley Bay is apparently the permanent establishment of suitable men and families in agriculture or other rural industries, *i.e.*, (a) in ordinary farm situations, (b) in market gardening or ordinary garden situations, (c) in small holdings in the neighbourhood of the colony and elsewhere; or by means of emigration.

The conditions of employment are as follows: In addition to maintenance at the Colony for continuous periods of one month, each man receives 6d. weekly as pocket money; and, if necessary, certain articles of clothing are supplied him, the cost being deducted from the weekly allowances sent to the patients family. These weekly allowances to the family are 10s. for the wife, 1s. 6d. for one child and 1s. for each other child under 14 years of age. Experience has shown that the average weekly payment per family on such scheme is 14s. 6d.

The daily routine at Hollesley Bay is as follows:—

Getting-up bell	...	...	5.45 a.m.
Work preparation bell	...	...	6.15 "
At work	...	...	6.30—8 a.m.

Breakfast...	...	...	...	8.0	a.m.
Work	...	...	...	8.30-12	noon.
Dinner	..	...	...	12	noon.
Work	...	...	...	1 - 5	p.m.
Tea	...	...	...	5.15	„
Supper	...	...	...	9.0	„
Lights out	...	...	...	10.0	„

The cost of food per head per week during 1905 varied from 6s. 3½d. from April to June, when there were 138-180 inmates, to 7s. 1½d. per head from July to September, when there were only between 45-80 inmates.

As to whether an "after-care" colony comprised solely of convalescent consumptives could be made an economic success remains to be proved. So far as evidence with regard to sanatoria and to labour colonies generally is at present available, the presumption is to the contrary.

But it may be contended that anticipation of a directly profitable result from a colony devoted to the "after-care" of consumptives is unreasonable. A sanatorium or a hospital or an infirmary is not expected to prove directly remunerative; and accordingly a "colony" for consumptives may properly be regarded solely from the point of view of an institution wherein the improvement or arrest of disease begun in a sanatorium may be continued and rendered permanent partly by further treatment and care, partly by training the consumptive to earn his livelihood under healthier conditions than formerly. The purely economic aspect of the tuberculosis problem must indeed be viewed, if at all, in a broader aspect.

Obviously, if a colony for the able-bodied unemployed cannot be made an economical success, it is unlikely that a colony solely for consumptives, for the most part absolutely ignorant of farm work, could be conducted except at a loss. If, however, the harder and more skilled labour at the consumptive colony was performed by thoroughly capable and experienced workmen it is conceivable that the loss might be reduced.

The report of the temporary colony at Garden City which was instituted in 1905 for unemployed workmen coming in the main from West Ham during February, March, and April, contains instructive material with regard to the labour there carried out. The colony was under the auspices of the Trinity College, Oxford, Settlement.

The work undertaken was of a simple character, involving little or no judgment on the part of the men, and report relating to such work states:—

"If no allowances are made for time lost through bad weather and for other reasons the average earnings of each man works out at rather over 4s. a week. This estimate is, of course, too low as an actual test of the energy put out by the men, yet even with liberal allowances for loss of time, the amount earned by each man would not cover the cost of his food at the colony. The circumstances under which the work was done

prevent any accurate conclusions being drawn as to the men's capacity and willingness to work. There can, however, be little doubt that they did not work very hard."

Later on the report adds with regard to the attitude of the men :—

"There can be little doubt that they looked upon it as of the nature of a holiday, and were not serious about the work they did. This was at first a supposition based on impressions. Several months afterwards one of the men, in discussing this question in a friendly and open manner, confirmed the supposition. He said that as each batch arrived their first question was, 'Well, what's the work like?' They generally received the reply, 'Oh, it's an easy job,' whereupon it became an easy job, that is to say, each person did no more than he could help doing."

Dr. Bardswell, referring to the experience at the Labour Colony at Hadleigh, says :—

"Men on the land for the first time in their lives, so an official tells me, cannot get through a third of the work of that done by a skilled labourer, and, as he remarked, it is not possible to turn a decayed clerk or a drunken doctor into a skilled agricultural labourer in a few months. When a man cannot pay his way the loss falls upon the colony, and when a man earns more than his keep he is allowed to keep the balance, thus encouraging thrift and industry. This principle is not favourable to the financial success of the colony, which, though run on business lines, is essentially philanthropic rather than commercial in character. Another factor which does not tend to its commercial success is that of the constant changing of colonists, for as soon as a man's work becomes of some real value he leaves. The colony passes through its hands some 500 men in a year, and the average stay is about four months. This work results in a loss of about £3,000 a year."

It will be remembered that the short period of residence of patients at sanatoria has elsewhere been urged as one of the reasons why employment at these institutions has not proved lucrative.

As regards the Garden City Colony the circumstances appear to have been somewhat exceptional and the administration not very rigorous. Moreover, it was only a temporary provision, and hence not, perhaps, fairly comparable with a permanent establishment where differentiation of work suitable to men with various qualifications and powers might be instituted. More information based on actual experience in this country is desirable before the financial prospects of a colony for persons in differing degrees of convalescence from consumption can be even approximately fore-shadowed.

Dr. J. E. Chapman is at the present time carrying out at his own expense an interesting experiment as regards the employment of consumptive patients at the *Coppin's Green Sanatorium Colony*, near Clacton-on-Sea, in Essex, where he has secured accommodation for 20 male patients, together with 20 acres of land to be used as a market garden. His object is to obtain quite early cases of the disease. The inclusive charge per week is 25s., but such patients as are able and willing to do so are allowed and encouraged to work in the market garden. Whatever amount they are able to earn is deducted from the cost of their weekly maintenance. The sanatorium is not conducted for profit, but it

must be self-supporting and on page 381 there will be found a statement of the first six months' working. Dr. Chapman hopes that by this means it may be possible to enable patients who have sufficiently recovered to do some, but not a full day's work, to continue at the sanatorium for a sufficient length of time to enable them to entirely recover their working powers, and, at the same time, afford them an opportunity of acquiring a means of livelihood which will be of use to them hereafter.

A number of selected convalescent patients who are working in the garden are, as vacancies occur, afforded the opportunity of continuing treatment at an inclusive weekly fee of 13s. 4d. This market garden is worked independently of the sanatorium, and Dr. Chapman informed me in September, 1907, that as this is the first year of its operation it cannot be expected to pay. He added, however, that the prospects are good. Three male patients were at that time employed, and in busy times as many as eight had found work in the gardens.

An important incidental consideration arises, no doubt, out of the difficulties discussed in this chapter, namely, the desirability wherever practicable of procuring sufficient land in connection with each sanatorium to enable suitable employment to be given to the patients. In several institutions which have come under notice attempts at employment of patients would have been made had the area and nature of the sanatorium site rendered this practicable.

The National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis, which has erected a sanatorium at Benenden, Kent, had this point in view when they secured a site of 250 acres, including two farms, upon which it is anticipated much employment will be found for the patients.*

* It is announced in "The Times" of December 7th, 1907, that Lord Carrington has offered a site in the neighbourhood of High Wycombe for the purpose of developing a scheme of market gardening for convalescents from phthisis. Apparently it is proposed to raise capital by the formation of a society or company, and by means of £1 shares.

CHAPTER XVII.

THE IMPORTANCE OF EARLY DIAGNOSIS WHETHER FROM THE VIEWPOINT OF TREATMENT OR PREVENTION.

Although there are in connection with the problem of sanatorium treatment many very debateable points, there is one subject on which opinion and evidence are alike at one, namely : the overwhelming importance of the early diagnosis of the disease towards the treatment and prevention of which the sanatorium régime is directed. Practically all the annual reports of medical superintendents of sanatoria continue to express regret that such a small proportion of the patients reaching their institutions are in the first stage of consumption, and it is quite clear from the statistics that the earlier the cases the better the immediate, and the more durable the after, results.

As regards the question of early diagnosis it would be instructive were more data forthcoming from English sanatoria as to the percentage of patients who, on admission, have tubercle bacilli in their sputum, and the value of such data would be enhanced were figures furnished as to the number of patients who, having bacilli in their sputum on admission, still yielded such bacilli when discharged from the institution. Clearly, data of this nature have an intimate bearing upon the value of sanatoria, whether in their curative or preventive aspects, and it will be seen by reference to Chapter III., Part IV., that in the German sanatoria considerable attention is paid to this aspect of the problem.

In this connection, in so far as English sanatoria are concerned, the report of the Westmorland Sanatorium is of interest. It will be seen by reference to the Table on page 494 that of the patients who had no tubercle bacilli in their sputum on admission both the immediate and after results were satisfactory in a very remarkable degree.* But concerning this Table the question has been asked as to how far the cases there detailed were actually cases of pulmonary tuberculosis, and it is obviously difficult for anyone to furnish absolute proof upon this point. But it may be said that scepticism, based upon the absence of bacilli in the sputum, raises the further question as to the means by which phthisis was diagnosed in pre-bacillary days, or as to how it is practicable to diagnose any "closed" tuberculous lesion. It is, of course, possible to raise question as to whether any case in which tubercle bacilli have not been discoverable in the sputum can be regarded as one of pulmonary tuberculosis, but, conversely, it

* Out of 56 "alight" cases treated from 1900-1905 tubercle bacilli were found in one case only. In a large number of cases there was no expectoration.

would be a very serious position to take up to urge that no patients whose sputum had not yielded tubercle bacilli should be admitted into a sanatorium. It might, indeed, be regarded as a fatal objection from a curative and consequently from a preventive standpoint.

It will probably be generally conceded that by the time tubercle bacilli have appeared in the sputum some breaking down of lung substance has already commenced and that if it is practicable to diagnose the presence of the disease with a fair degree of probability before the appearance of the tubercle bacilli in the sputum much valuable time may be gained.

There are authoritative statements both for and against this view and some useful data in this connection are furnished by Turban in his "*Beiträge zur Kenntnis der Lungen-Tuberculose*," which was published in 1899 and part of which has been admirably translated by Dr. Egbert C. Morland.*

As regards the view that pulmonary tuberculosis may be diagnosed before the appearance of tubercle bacilli in the sputum, Grancher observes "In ordinary phthisis the appearance of bacilli in the sputum is tardy. It is preceded by physical signs of the first stage often complete enough to establish the diagnosis."

With this view Turban himself expresses agreement when he says, "Clinically the first stadium of tuberculosis of the lung may be demonstrated before bacilli appear in the sputum"; and Oestrench presents the case clearly in saying that "In common phthisis the anatomical changes . . . are frequently of such a kind that the tubercle bacilli actually present in the tissues can find no means of exit whilst the foci are large enough to be demonstrated by percussion . . . A negative result, then, of sputum examination in no way excludes the existence of foci producing physical signs, so that in these cases the earliest recognition of the disease can only be obtained by physical examination."

On the other hand Turban quotes to the effect that, "It may rank as one of the best established rules of diagnosis that . . . tuberculosis may be excluded in any case of lung affection in which repeated skilled examination has failed to demonstrate tubercle bacilli"; and Strumfoll says that, "At the present time the examination of sputum for tubercle bacilli plays the most important role, and the only one, in the recognition of commencing phthisis."

But most of the authorities quoted wrote now several years ago, and there are clearly many cases of commencing phthisis

* "The Diagnosis of Tuberculosis of the Lungs, with special reference to the early stages." By Dr. K. Turban, Director of the Sanatorium at Davos, with an introduction by Sir Dyce Duckworth, M.D., LL.D., F.R.C.P.; translated by Egbert C. Morland, M.B., B.Sc., Lond. (John Bale, Sons & Danielsson : London, 1905.)

where sputum is practically absent. It is, I imagine, the prevailing medical opinion at the present time that it is not justifiable to postpone treatment until tubercle bacilli appear in the sputum. If a contrary opinion were to be taken it would be equivalent to an avowal that it is impracticable to diagnose "closed" tuberculosis. As Dr. Theodore Williams stated in his lectures on the diagnosis of pulmonary tuberculosis in 1903, "where the bacilli are plentiful there is probably a cavity in the walls of which they multiply and are easily expectorated. Therefore for diagnosis we must depend very largely upon physical signs which, after all, have served their purpose wonderfully well."

Still more recently, Grancher, at the Paris Congress, 1905, in his paper, "Premier Etape de la Tuberculose Pulmonaire diagnostique précoce par l'auscultation," wrote, when discussing the value of bacilli, "attendre la présence du bacille tuberculeux c'est à dire en somme la présence de cavernules pulmonaires, c'est faire œuvre mauvaise c'est causer au malade un immense préjudice, car c'est rendre incurable ou très difficile à guérir une tuberculose curable, si elle eût été antérieurement reconnue."

As this report deals mainly with the question of sanatoria, discussion as to the relative values of different diagnostic agents and methods would be out of place, but reference may be made to the fact that auscultation, percussion, and bacteriological examination of sputum have had added to them within recent years radiography, the tuberculin test, the opsonic index of Wright, and the chemical exchanges of Robin and Binet—these latter agencies claiming to recognise not only a tendency to tuberculosis, but also the degree of such proclivity. There is, too, some evidence indicating that the tuberculin ophthalmic reaction* may in the future prove a helpful aid to diagnosis.

But whatever method or combination of methods be adopted, Dr. Latham† expresses current medical opinion when he says that "the early diagnosis of pulmonary consumption is a question of supreme importance, perhaps the most important which the physician has to face."

* See "Lancet," November 23rd, 1907, p. 1462, Berliner Klinische Wochenschrift, November 25th, 1907, and Le Bulletin Medical of November 20th, 1907.

† "The Diagnosis and Modern Treatment of Pulmonary Consumption, with special reference to the early recognition and the permanent arrest of the disease." By Arthur Latham, M.A., M.D., Oxon; M.A. Cantab.; F.R.C.P. London. (Second edition.) Bailliere, Tindall, and Cox. 1905.

CHAPTER XVIII.

THE SANATORIUM IN ITS EDUCATIONAL AND PREVENTIVE ASPECTS.

The difficulties of correctly gauging the curative value of sanatoria are, as has been seen, very considerable, partly owing to a lack of precise knowledge as to the duration of more or less selected cases of pulmonary tuberculosis in pre-sanatorium times and partly in consequence of the fact that, as yet, the data relative to sanatoria in this country have but rarely been kept in a fashion calculated to bring out the real value as regards "after-results" of these institutions.

Similar difficulties beset an attempt to measure the educational and preventive rôle of these establishments and any conclusions arrived at must be the result rather of broad general inferences than of statistical data. It is sufficiently clear from the statistics furnished relative to sanatoria that the immediate results of the life at these institutions are frequently very satisfactory, and it is reasonable to infer from this fact that the adoption of similar methods of living, altogether apart from a sanatorium, will be likely to exercise beneficial effect upon tuberculous subjects.

The further inferences may be drawn that what the French call the "pre-tuberculous"—obviously not an inconsiderable group whether by heredity or otherwise matters little—who adopt this healthful mode of living will be able to resist tuberculosis in a better fashion than were they to lead unhealthy lives. In so far, therefore, as residence in a sanatorium may conduce, by education and example, to a diffusion of this knowledge of how to live, must the credit account of the sanatorium be enhanced.

But this influence should obviously not be limited to the tuberculous and pre-tuberculous, it should extend gradually to the whole population and thus conduce materially to the well-being of this and succeeding generations, its influence being probably greater upon the plastic organism of youth than upon the relatively stable economy of the adult.

Another and important influence of sanatoria is in the direction of educating persons with "open" tuberculosis as to the proper means of dealing with their sputum, and the value of sanatoria in this sense will increase or diminish in inverse proportion to the precise amount of human tuberculosis with which subsequent experimental research may accredit bovine tuberculosis.

If, as until quite recently was generally believed, the bulk of human tuberculosis is derived from members of the human species affected with "open" tuberculosis of the lungs it is likely that

the amount of education afforded to patients at sanatoria in this matter of the control of their sputum will limit the spread of the disease.

Sanatoria should also limit spread in this sense if it can be shown that a considerable proportion of the patients who enter these institutions with expectoration and tubercle bacilli in their sputum leave either with no expectoration or, if with expectoration, with no tubercle bacilli therein.

Although information as regards these latter points is not generally available for English sanatoria, there will be found in Chapter III. of Part IV. certain data upon this very important subject. Tables VII. and VIII. in that chapter afford a good indication of what may be anticipated in this respect by a three months' treatment in sanatoria of relatively early cases.

It will be seen that, as regards expectoration 88·7 per cent. of 12,344 patients had cough and expectoration on admission and that on discharge this percentage was reduced to 67·4 while, in reference to absence of cough and expectoration, a percentage of 6·5 on admission became 27·2 on discharge. With respect to the presence or absence of tubercle bacilli such organisms were detected on admission in 51·5 per cent. of 12,401 cases while on discharge the organism was found in 70·2 per cent. of those persons whose sputum contained the organism on admission. Amongst those patients who had expectoration both on admission and on discharge the bacillus was detected in 41·7 per cent. on admission and 39·0 per cent. on discharge.

It will be clear, therefore, that the sanatorium treatment as practised in Germany has but a relatively small effect in promoting the arrest of expectoration and the disappearance of bacilli.

There is, however, one very important educational influence of sanatoria to which no reference has yet been made, and that is their value in bringing home to the patients, to their friends, and to the public, the paramount importance of the early recognition and treatment of the disease.

From the point of view of arrest of the disease it would be difficult to assess this influence too highly.

It must be conceded that the educational value of sanatoria, in one or another aspect, is very considerable in the direction of promoting the public health generally, *i.e.*, in so far as these institutions spread amongst the wage-earning classes the desire for a healthy life they must tend to influence the well-being of the people and thus to promote health quite independently of their direct influence upon tuberculosis.

It will be seen too, by a reference to the chapter dealing with the individual sanatoria that certain of those institutions (*see* Devon & Cornwall, p. 366, Maitland Cottage, p. 456), being dissatisfied with their results in a curative sense, are proposing to

devote some of their beds to purely educational purposes. It may be mentioned, too, that in certain towns, Manchester, Brighton, Leicester, St. Helens, Lewes and others, a certain number of beds at one or other of the isolation hospitals are utilised to educate consumptive patients as to the proper disposal of their sputum and the conduct of their lives. But this subject will be further dealt with in the next chapter. There are some persons who think that the best uses to which sanatoria could be put would be that of educational establishments for the consumptive patient.

Apparently the Germans rank this educational value of sanatoria highly, as will be seen by Chapter III. of Part IV. For instance, Herr Gebhard considers that altogether insufficient justice would be done to sanatoria were no regard paid to the inconvenience and chagrin spared to the families of those who are successfully treated. The existence of the German sanatoria are regarded as being largely due to a desire to raise the level of the general health and those institutions have, it is contended, shed light on the importance of general hygiene amongst the working classes. It is pointed out that "some thousands of individuals are now following every year in the German sanatoria what may be termed a practical course of hygiene which cannot fail in some degree to influence not only their own lives but the lives of others with whom they are brought in contact."

The general question which would seem to arise out of the foregoing considerations is what is the most economical and efficacious method of education in this sense? Can it be carried out in schools and elsewhere on general educational lines; can it be effected by visits from the sanitary staff of local authorities or by trained health visitors, or can it alone be properly carried out by the object lessons afforded at sanatoria or hospitals? The answer probably depends upon local circumstances; the intelligence and class of the people, and the facilities at the disposal of the local sanitary authority.

CHAPTER XIX.

THE UTILISATION OF EXISTING ISOLATION HOSPITALS
FOR THE EDUCATION AND ISOLATION OF PHTHISICAL
PERSONS.

Although there is not at present much to chronicle under this head it may be useful to make reference to practices which are now in vogue in certain towns such, for instance, as Manchester, Brighton, Sheffield, St. Helen's, Leicester, Lewes, Northampton, Lanchester, and a few others.

So far as I am aware the first town to utilise its isolation hospital for this purpose was Manchester, in which city Dr. Niven commenced the experiment in 1901. Owing, however, to the occurrence of small-pox the experiment was interrupted and it was not resumed until 1904.

Manchester.

Wards at the Clayton Vale (Small-pox) Hospital were opened for cases of phthisis on April 26th, 1901. Small-pox, however, broke out in October, and the phthisis patients had to be sent home until November 28th, when certain of them were re-admitted. But a further outbreak of small-pox necessitated their discharge early in January, 1902.

The following summary, taken from Dr. Niven's annual report for 1901, conveys a good idea of the results of 5 early, and 15 advanced cases :—

Deaths	...	...	3	<ul style="list-style-type: none"> (a) No improvement. (b) At first improvement. (c) Improved at first, 8 lbs.; while outside hospital fell off 14 lbs in eight weeks.
Improved	...	...	8	<ul style="list-style-type: none"> (a) After primary fall improved 5 lbs. (b) Improved 18 lbs. (c) " 8½ lbs. (d) " 11½ lbs.; later a fall; ultimate improvement 4½ lbs. (e) Improvement 6 lbs. (f) " 6½ lbs. (g) " 18½ lbs. (h) " 4½ lbs.
Unchanged	...	...	7	Of which <i>all</i> were in hospital under six weeks.
Worse	...	...	2	One of them in hospital only three weeks.
Total	...	...	20	

The report adds that in view of the fact that many cases get rapidly worse in the crowded homes of the poor, the above results must be regarded as decidedly encouraging. These provisional conclusions have been confirmed by subsequent experience.

In his annual report for 1905, Dr. Niven states that at Clayton Vale the Corporation has re-opened cottage wards at the

Small-pox Hospital for patients suffering from consumption. There are in all 32 beds, 16 for men, and 16 for women, and all have been filled for nearly a year.

The patients admitted into this hospital are for the most part persons in an advanced phase of the malady, and Dr. Niven states that it is surprising what progress they make at first.

The results are thus presented in the annual report for 1906 :—

Table showing history of all cases treated in Clayton Vale Hospital up to the end of 1906, and of all Municipal cases treated in the Crossley Sanatorium up to May, 1907.

CLAYTON VALE HOSPITAL.

Year.	Cases Admitted.	Cases Discharged.*	Died in Hospital.	Dead December, 1906.	Discharged and now fairly well, lungs improved, December, 1906.	Discharged and now fairly well, lungs not improved, December, 1906.	In full work, December, 1906.	Partially working, December, 1906.	Lost sight of.	Still in Hospital, December, 1906.
MALES.										
1904 ..	20	In 1904, 5 In 1905, 8 In 1906, 2	3	14	0	0	0	0	1	2
1905 ..	24	In 1905, 8 In 1906, 8	5	10	3	2	3 (74)	0	1	3
1906 ..	39	21	4	10	2	2	3	0	2	11
FEMALES.										
1905 ..	21	9	6	8	3	0	3	1	1	6
1906 ..	22	6	2	5	1	0	0	0	1	14

* These include two admitted in 1904, discharged in 1905, readmitted, and still in the hospital.

CROSSLEY SANATORIUM.

Year.	Cases Admitted.	Cases Discharged.	Died in Sanatorium.	Dead, May, 1907.	Discharged with lungs improved, and now keeping well.	Discharged with lungs not improved, but now well.	In full work, December, 1906.	Partially working, December, 1906.	Lost sight of.	Still in the Sanatorium.
1905 ..	30	28	1	10	2	4	7	0	3	1
1906 ..	32	25	1	6	4	2	4	2	2	6

The above tables relate, as will be seen, to the cases treated on the one hand at Clayton Vale and on the other hand at the

Crossley Sanatorium, this latter table referring only, it is of great importance to note, to the *municipal* cases, *i.e.*, to cases sent in to the Corporation beds at Crossley by the Manchester Corporation. The cases admitted into Clayton are for the most part those in the advanced stages of the disease, those admitted into Crossley, to the Corporation beds, being cases in which tubercle bacilli have been detected in the sputum, a condition which coupled with others render these Corporation cases less suitable as a rule than those cases admitted through the Manchester Consumption Hospital. It is important that these facts should be borne in mind, otherwise a mistaken notion of the value of the Crossley Sanatorium might be deduced.* Referring to the Clayton Vale cases, Dr. Niven observes :—"Nothing can be more striking than the manner in which cases, and a few of them apparently sinking, begin to pick up directly after admission and regain no inconsiderable measure of comfort and strength, while putting on weight to a surprising extent." In his view such improvement is due to (1) absence of home worries ; (2) good and ample food, and (3) skilful treatment and nursing. He suggests that patients, coming as they do from the working classes, enjoy during their sojourn at the hospital the advantages of a social class above their own, and hence their disease progresses more slowly, approaching, indeed, the type observed in the well-to-do classes. I have myself made a somewhat similar suggestion to account for the immunity from phthisis of attendants at consumption hospitals.

It could not be expected, Dr. Niven states that the patients discharged from Clayton should maintain the improvement gained, and he adds that "it is depressing to observe the manner in which a large section of the patients discharged, either from sanatoria or segregation homes, begin to fail rapidly soon after leaving the institution." Comparing the results obtained at Clayton and at Crossley, Dr. Niven points out that the Crossley results do not differ materially from those obtained at Clayton, but he is careful to insist, as already observed, that the cases sent to Crossley by the Corporation are more advanced in stage than those sent in by the physicians at the consumption hospital.

He thinks that, having regard to the position of the Clayton Hospital in an enclosed valley close to the Medlock and a quarter of a mile from a dust "tip," the results obtained are remarkably good, and, although greater progress might reasonably be anticipated in a perfectly pure atmosphere, he has long thought that unless the atmosphere is decidedly dusty or grimy, atmosphere is not a determining factor. Given complete rest, good food, good cooking, and a pleasant home, excellent results may, in his opinion, be obtained through sanatoria in any part of

* For statistics relative to this institution, see chapters on Sanatorium Statistics (chapters XII. and XIII.).

Manchester, an expression of opinion which would appear to receive support from the results obtained by Dr. Bardswell* in the somewhat "insalubrious" atmosphere in which the Royal Infirmary at Sheffield is enveloped.

Brighton.

In recent years a certain number of beds have been set apart at the Brighton Isolation Hospital mainly for what may be termed the educational treatment of persons suffering from pulmonary tuberculosis, and it is claimed that by such treatment (1) the patient himself is benefited; (2) the house from which he has been removed can be cleansed and disinfected; (3) the patient's wife and family can "have a holiday in the sense of being free from repeated attacks by the infective material causing consumption," the patient on being sent home is "no longer a source of risk to his family and to those with whom he worked."

The experiment was commenced in 1902, and it was regarded as so satisfactory by Dr. Arthur Newsholme, the medical officer of health, that the number of beds to be made available for phthisis was soon increased from 4 to 10, and in 1904, owing to the fact that a local philanthropist, Mr. Hedgcock, had left a substantial sum to the Town Council for charitable purposes, it was resolved that the interest of £20,000 should for ten years be devoted to the maintenance of Brighton consumptives in the fever hospital. Consequently in April 1906, the ten beds were increased to 25, including three beds for paying patients, 12 to be maintained by the Hedgcock Bequest, and ten provided by the Town Council. All twenty beds are provided at the Borough Isolation Hospital.

What are termed the "municipal" patients are admitted as a rule each for a period of one month, preference being given to men and women still able to work, who are likely to benefit personally by the rest, treatment, and training, and whose education is calculated to prevent infection whether of fellow-workers or family. These are received gratuitously.

The Hedgcock patients are derived apparently from a poorer and more helpless class than the municipal, some of them being very advanced or even dying cases "for whom continuance at home is undesirable owing to difficulties as to nursing, or because there is a large family, and much danger of infection." These patients are kept in the isolation hospital as long as may appear desirable or is convenient, some for several months.

The number of cases dealt with at Brighton year by year since 1902 is set out in the following table. It should be borne in mind that it is only since 1906 that advanced cases have been admitted to hospital; but in that year about 50 per cent. of the

* The Consumptive Working Man.

total number of cases notified in the town during that year were passed through the hospital :—

Year.	Cases treated at Isolation Hospital.	
	New Cases.	Re-admitted.
1902	25	—
1903	96	3
1904	131	6
1905	130	7
1906	181	32

In selecting cases for the hospital curriculum attention is paid less to the possibility of cure or arrest than to the advantages that may be anticipated in any individual case from the education or training to which the patient is subjected and by means of which he is taught that in so far as cure may be practicable the matter is in large part in his own hands; he being shown, by precept and example, the best means of leading a healthy existence. Similarly with reference to danger to his family or co-workers, the patient is taught how to manage his cough and expectoration on the basis of current views as regards infectivity of phthisis.

The above being the object in view, the circumstances which are taken into consideration in selecting patients are (1) age, (2) size of family, (3) occupation, (4) stage of disease, and (5) social position; the suitability of the patient for admission depending largely upon the answers to the following questions :— (1) “ Will the treatment begun at the sanatoria, if subsequently continued, give a reasonable chance of a cure ? ” (2) “ Even if there is no reasonable chance of a cure, will the treatment and training diminish and possibly prevent the spread of infection to others when the patient leaves the sanatoria ? ”

Apparently a single block in the fever hospital, formerly used for diphtheria, is now utilised for phthisis cases, the patients from this and the other blocks exercising in a common recreation ground, but those from different blocks being confined, though not by walls or fences, to certain prescribed areas.

The nurses from the phthisis wards are allocated to a separate table in the dining-room, wherein nurses from the diphtheria and other wards dine, but they sleep, however, in separate rooms on the first floor of the administrative building. The nurses for different diseases are allowed to go out together and they occasionally use a common sitting-room.

The block allotted to the consumptive patients is visited first by the doctor, and overalls are used by him in visiting the other blocks. In the laundry, where the linen for all wards is washed, certain precautions are taken, as also is the case with the utensils from the common kitchen.

It is stated by Dr. Newsholme that "during the last five years, in which 567 consumptives have been treated for an aggregate period of 2,828 weeks, or an average of five weeks for each patient, not a single case of an acute infectious disease has occurred among the patients." Probably the phthisical patients are for the most part at an age but little prone to contract either scarlet fever or diphtheria.

Leicester.

Dr. Killick Millard in September, 1903, commenced the experiment of treating, on similar educational lines, a limited number of consumptive patients at the Leicester Borough Hospital, but, as in the case of Manchester, the experiment was unfortunately interrupted for a few months on two occasions by the occurrence of small-pox in the town.

One block surrounded with balconies was set apart for the above purpose, and accommodation for 18 patients—nine males and nine females—thus provided. Two glass shelters were also erected in the hospital grounds.

Patients were in the first instance admitted for an educational course of one month; but such material benefit accrued in some cases that the period of stay has been sometimes prolonged. Also a certain number of patients whose friends have been able to contribute towards the cost of maintenance, have each been allowed to remain as paying patients for three months or longer.

During 1906 the above procedure was somewhat modified. Cases were admitted in the first instance for one month only; at its termination, if the patient had made marked progress, and desired to remain, he was allowed to do so on paying a sum of 10s. per week towards the total cost of his maintenance, which amounted to about 15s. weekly. At the end of the second month if the patient was still progressing he was allowed, if he wished to do so, to remain for a third month, free of charge.

During 1906, 25 patients paid to remain beyond their month, the sum thus received having been £55.

Dr. Millard observes with regard to this cost, that on the basis of 15s. weekly, the cost of 12 weeks' treatment amounts to £9, towards which the patient or their friends contributed in each instance £2. As, however, many patients remained less than three months, the cost per patient, deducting the amount paid, came out at £5 3s. 1d.

The number of cases treated year by year has been as follows :—

1903 (last three months)	...	...	...	61
1904	...	...	...	120
1905	...	...	...	156
1906 (out of 156 applicants)	...	...	...	69
				<hr/> 406 <hr/>

The usual difficulty in securing early cases has been experienced at Leicester. It is stated that of the patients notified during 1905 and 1906 the average duration of the disease prior to notification was 16 months, whereas of the carefully selected cases which were admitted to hospital for treatment during 1906 the average duration of the illness had been seven months. Efforts are made to obtain cases within three or four months of the commencement of the illness, but largely without success.

As regards the immediate results, a large number of the cases, as was to be anticipated, showed material improvement; there can indeed be no question that the rest, nourishment, and wholesome surroundings provided at the hospital would prove beneficial to the poorer classes generally, even if they were in relatively good health at the time of admission.

During the period 1903-5 inclusive there were 338 not very carefully selected cases treated, and the results as to these persons—the average length of stay having been five weeks—are thus classified :—

290 increased in weight.
 31 lost weight.
 15 remained stationary or result was not stated.
 2 died.

338

The results as regards the 69 cases admitted during 1906 were as follows :—

59 improved : average gain in weight, 9 lbs.
 2 remained stationary.
 3 got worse.
 1 died.
 4 remained in for less than 15 days.

69

Dr. Millard points out that even with the longer time patients have remained in hospital during 1906, the duration of treatment is still much below what it ought to be if cure was the only and principal object. In his opinion even for very early cases three

months is the minimum period required for permanent arrest of the disease, and that not infrequently six months or a year may be necessary.

As regards after-results at Leicester there is not much to chronicle; they correspond generally to those already dealt with in this report. Dr. Millard observes in reference to certain cases :—

“The time that has elapsed since these patients left hospital is not very long, but I have particulars of a number of cases which were under treatment in 1905, 1904 and even 1903, and who are still at work, though it is only right to point out that the majority of the patients treated in those years are either dead or likely to die.” He adds, “the effort to cure consumptive patients is intensely interesting, but it would be a misfortune if we allowed it to divert our efforts from the far more important work of preventing the disease.”

CHAPTER XX.

THE DESIRABILITY OF BETTER ORGANISATION FOR THE
EARLIER RECOGNITION OF CASES OF PULMONARY
TUBERCULOSIS.

After all that has been said in previous chapters it is unnecessary to insist upon the need for more co-operation between already existing agencies for dealing with tuberculosis.

It has been made sufficiently clear that if phthisis can be detected at the earliest practicable moment the prospects of material arrest in the disease are considerable.

At the present time it is too frequently the case that those patients who present themselves for the first time at hospitals, dispensaries or sanatoria are already in a stage of the disease when their chances of recovery are somewhat remote even under conditions best calculated to promote such recovery.

If, therefore, the greatest utility is to be made of existing agencies for the control of consumption the most fundamental change necessary is that the public shall be taught the importance of seeking medical advice at an early date. It is only by education in this sense that the difference which at present separates the uneducated from the educated can be bridged over. It is conceivable that this very difference may exert an influence in reducing the enormous death-rate of pulmonary tuberculosis upon the poor and ignorant.

Education, and the better co-ordination of the heterogeneous forces at present concerned with consumption are essential if the maximum benefit is to be derived from treatment whether within or without sanatoria.

As to education, which is regarded by many competent observers as one of the most essential factors in the whole problem, there should be but little difficulty, having regard to the fact that the local sanitary authority is often the education authority, and the opportunities for carrying out such education in a practical fashion will doubtless increase in proportion as that great health essential, the medical examination of school children, advances.* Moreover, education in this specific sense may also be undertaken by numerous philanthropic and religious bodies and by the press. Clearly such education is already taking place through the public interest which is being manifested in consumption and by the discussions which are reported in the press.

To sketch out a general scheme for the better detection of early cases is beyond the scope of this report and obviously local

* See Chapter XXV. relative to the teaching of hygiene and the medical inspection of school children in the public elementary schools.

circumstances must largely govern the arrangements. But it would prove advantageous in anything approaching populous communities could there be established or utilised some central bureau which, by promoting interchange of information and by keeping in touch with the various institutions concerned with consumption either directly (consumption hospitals, out-patient departments and sanatoria) or indirectly (local sanitary authorities, bacteriological laboratories, general hospitals, dispensaries, health visitors, charitable organisations, etc.) might assist in the differentiation of cases and the selection of suitable patients for sanatorium treatment.

In so far as actual *cure* or *arrest* of pulmonary consumption is concerned the main point is to *search out* early cases of the disease with a view to the application of the most suitable treatment which may be available, and it is of importance to note that suitability for treatment in a sanatorium implies far more than the extent and nature of the physical signs and the actual condition of the patient; such suitability embraces, in addition, social and psychical fitness.

By social suitability is meant not only whether the habits of the patient fit him for residence in any sanatorium which may be available, but whether he is in a position to defray or contribute to the cost of a sufficiently prolonged treatment and, if not, whether such payments or contributions can be made by the friends or employers. It is, too, desirable to ascertain whether those dependent on the proposed patient can be adequately provided for during the prolonged treatment and perhaps, too, whether there is a fair prospect, on the patient being discharged from the sanatorium, of procuring some employment calculated to promote the retention of his wholly or partially regained health. Generally speaking, the chances of the unmarried are better than those of the married, but there are many exceptions to this statement. A single man can stay longer at a sanatorium than a married man, and he can live afterwards on a smaller wage than a married man with a family. The psychical aspect of the problem is largely covered by the foregoing remarks, but general experience is to the effect that the hypochondriacal patients whose circumstances may entail constant worry on account of their dependants do badly. As regards sex the general experience, both in Germany and other countries, is to the effect that females do better than males (see chapter on German sanatorium statistics in Part IV.), while as regards age it is matter of common knowledge that the young do better than the old.

With reference to this question of the co-ordination of the several forces concerned with consumption reference may be made to the "Anti-tuberculous Dispensaries" which have, perhaps, reached their highest development in France and especially in Paris, but in estimating their value and suitability for England and Wales it has to be remembered that the sanitary organisation

of this country is considerably in advance of that of France. Consequently, it is found that certain matters dealt with by the sanitary authorities in this country come within the functions of the "Anti-tuberculous Dispensary" in France.

These dispensaries endeavour to deal not only with the obviously tuberculous but they aim also at seeking out such persons who are in the early stages of, or are even predisposed to, consumption.

The first of these institutions, the Emile Roux Dispensary, was opened at Lille in December, 1902, through the instrumentality of Professor Calmette, Director of the Pasteur Institute in that city. At the end of 1905 there were in France sixty-two of these institutions of which thirty-eight were in the region of the French capital. One of the main objects of these institutions is to afford medical advice, food and clothing to the patients; but they seek also in principal to search out the tuberculous and the "pre-tuberculous," to send the early cases to sanatoria and the more advanced to hospital, and to help, so far as may be practicable, that large body of patients who under existing circumstances can find a place in neither of those institutions. These dispensaries, by keeping in touch with sanatoria and charitable organisations are able to aid the patients in numerous ways, to facilitate the return of the "pre-tuberculous" to the country and to secure them a more suitable employment; to bring about the disinfection of infected dwellings and to draw the attention of the authorities to insanitary houses. This they are able to do largely through the instrumentality of lady visitors who are attached to several of these dispensaries, and who make it their duty to visit patients at their own homes and to inculcate into them the elements of hygiene. One of the most recent institutions of this nature in Paris is the "Dispensaire Anti-tuberculeux Jacques Siegfried et Albert Robin" which was founded by Messieurs Jacques Siegfried and Robin at the Beaujon Hospital in January, 1905. Although its functions are those already referred to, its special feature is the diagnosis of the "pre-tuberculous" state by means mainly of an examination by chemical methods of the respiratory changes of the suspected subject, a study to which M. Robin (one of the Directors) and M. Binet have devoted special attention.

The premises on which this dispensary is situated belong to the "Assistance Publique," but the organisation of the institution is entirely independent of that body, which has, however, by decree recognised the institution as "of public utility."

These anti-tuberculous dispensaries are now to be found in considerable numbers in countries other than France, and it is of historical interest to note that a work very similar to that carried out at these dispensaries has been in operation for almost twenty years at the Royal Victoria Dispensary at Edinburgh on lines laid down by Dr. Phillip. It has, too, to be borne in mind that the out-patients' departments of our

hospitals for consumption are in a sense analogous to the anti-tuberculous dispensaries, and by a little re-organisation they might be made to serve a somewhat similar purpose. It would, indeed, seem possible by a general co-ordination in the office of the local sanitary authority, of all institutions having for their object the control of tuberculosis, to evolve a system which would prove even more efficacious than the anti-tuberculous dispensary, and which might have the effect of concentrating all information relative to tuberculous cases in an already existing and relatively highly developed sanitary organisation in every district, such organisation being perhaps still further centralised as regards rural districts in county councils. The main factor necessary for ensuring the maximum success of some such scheme is the willing co-operation of the people themselves. Any severe repressive measures such as might conceivably result as a consequence of an ill-devised and badly administered system of compulsory notification might possibly defeat its own ends by leading to the suppression of existing cases and to a lack of co-operation on the part of the public in the search for early and advanced cases.

A voluntary system of notification followed up by measures which in addition to being preventive would have the effect of proving helpful to the patients should no doubt result in an extended sphere of usefulness for the officers of the local sanitary authority, who could thus co-operate with local dispensaries and hospitals by inducing persons suffering from obscure forms of ill-health and chest affections to seek medical advice at once, and the work might probably be efficiently done by the appointment of female sanitary inspectors, that is to say, if the expenditure in the provision of a sufficient number of medical men was regarded as prohibitive.

It would be an easy matter for every sanitary authority in the country to impress by circular upon the people the enormous importance, as regards the chances of arrest, of the early recognition and treatment of consumption.

An additional reason for co-ordinating all the tuberculous measures in the office of the health authority is that such a measure would afford facilities for the bacteriological examination of sputum where a municipal laboratory already existed or conduce to such provision in places where there was no such institution. Moreover, the fact that the medical practitioners of a district were able, when necessary, to secure the gratuitous examination of sputum would tend to cement together all parts of the anti-tuberculous organisations, and to bring about the notification of cases by medical practitioners.

At Manchester, and in a minor degree in a few other places, there has been developed in connection with a system of voluntary notification there in vogue since 1899 much co-operation between the health authority and the hospitals. Such co-operation has no doubt been materially fostered of late by the fact that the Cor-

poration has secured 20 beds at the Crossley Sanatorium, and that there are several institutions for dealing with the tuberculous sick in or near the city.

Dr. Niven observes, however, in his annual report for 1905, that great aid to the notification scheme would accrue could more patients be treated in conjunction with it, and he adds that so fully is this point realised at the institutions for consumption in and around Manchester that all cases coming to the notice of the staff at these hospitals are notified to the medical officer of health. By visiting such cases and dealing with them in the manner set forth in the chapter on notification it is possible to fulfil many of the functions undertaken by the anti-tuberculous dispensaries of France.

Manchester is at present provided with four institutions for the tuberculous sick, *i.e.*—

(1.) The Crossley Sanatorium in Delamere Forest, Cheshire, which was erected by Mr. Crossley, M.P. There are here 100 beds, 20 of which are retained by the Corporation of Manchester by a weekly payment of £1 per bed. These 20 beds are reserved for cases notified under the voluntary system of notification in Manchester, and who in addition (a) must be in an early and "open" stage of the disease, *i.e.*, tubercle bacilli must be demonstrated in the sputum; (b) must be *suited* for admission to the sanatorium in the opinion of the physicians of the Manchester Hospital for Consumption; (c) must come from a crowded house, or must in some way be dangerous to the household.

(2.) The Bowdon Sanatorium, which contains 50 beds, for Manchester and the district, and into which only early cases are for the most part admitted.

(3.) The Sunnyside Home at Openshaw, near Manchester, which Mr. Crossley has provided with 25 beds for advanced and bed-ridden cases.

(4.) *Clayton Vale Hospital for Consumption* (the Small-pox Hospital), at which institution the Corporation has provided 32 beds (16 for males and 16 for females).

(5.) In addition to the above provisions, there is also accommodation at the three workhouses of the city, all of which have separate wards for phthisical cases.

Dr. Niven considers that there is still required—

(1.) A hospital for cases of phthisis not in the early stage of the disease. He thinks that from an economical standpoint the expenditure would be justified in that it would save people at working ages from infection, and that incidentally many cases treated would recover a working value.

(2.) A fund from which assistance could be rendered to householders in which the breadwinner is struck down with phthisis but where the children are too young to earn wages. In any case Dr. Niven considers that special provision should be made to so nourish the children as to render them able to resist infection, and this fund should be administered in connection with the notification scheme.

Dr. Niven in course of some observations in his Annual Report for 1906 relative to certain sanatorium figures, states:—

It is, however, to me extremely doubtful whether anywhere a large proportion of cases of undoubted pulmonary tuberculosis go on to complete and permanent recovery. On the other hand, it is certain that the earlier the stage of the disease the more likelihood there is of this result

being attained. It is, therefore, of first importance that the patients should be sent into hospital at the very commencement of their illness. So far as I can judge, the chief impediment in the way of attaining this object lies in the reluctance of breadwinners and mothers to leave their homes until they are compelled. But it is one which would be removed to a large extent if there were security for the maintenance of the family during treatment of the person attacked."

As Dr. Niven observes, the breadwinner is quite justified on almost every ground in adopting this attitude, as if any other members of the family have already developed the disease, it is of the utmost importance that their physical condition should be such as to enable them to resist the progress of the disease. The marked improvement of even advanced cases when given rest and good food, indicates, as he points out, how great is likely to be the effect of such conditions in the early steps of the malady.

Later on in the same report Dr. Niven observes :—

If we are to expect the greatest result from specific measures directed to particular cases in dealing with the prevention of phthisis, the maintenance of nutrition in families invaded by phthisis is equally the most direct way of obtaining those results in relation to phthisis which would accrue in less measure from a general increase in well being.

Dr. Niven refers to a highly instructive table compiled by Mr. Lock as to the resources of certain families from which cases of phthisis had been notified. Such table indicated *inter alia* that in 41 out of 64 instances investigated the means of the family invaded by phthisis did not suffice to procure suitable clothing and other household necessities and to pay the rent. He then, after discussing the practicability of additional poor law relief, or assistance from the Charity Organisation Society, suggests that the sanitary authority is the best source from which further assistance should be derived, the object being not merely relief, but the prevention of disease. His view is, it appears, that a municipal grant might be given to certain families invaded by phthisis provided stated conditions were complied with. Such conditions are to comprise cleanliness of home and occupants, the observance of personal precautions on the part of the patient, disinfection as required, the accurate record of all moneys spent, and an expression of the patient's willingness to enter a hospital or other asylum, is necessary.

As illustrative of the value of nutrition in maintaining the resistance of phthisical patients discharged from sanatoria, &c., Dr. Niven furnishes a table drawn up by Mr. Lock showing, both for Clayton Hospital and Crossley Sanatorium, the after history of a number of cases in relation to their circumstances as regards food, &c. This table suggests that nutrition exercises a powerful influence as regards recovery, and as Dr. Niven observes, it may be asserted that, other things being equal, the same is true to a still greater degree as regards infection. It will be observed that the table does not relate to all the cases discharged, but only in the main to those who have survived.

Table showing the condition up to May, 1907, of cases of Phthisis treated in Clayton Hospital and Crossley Sanatorium since 1904 who have survived to the present time.

CLAYTON CASES.

Prog. No.	Sex.	Age.	Condition on Discharge.	Date of Discharge.	Food, &c.	Subsequent reports on Patient's Health.
925/04	M	19	Good condition. Two lobes ..	October 19, 1905	Good ..	Lost ground, then gained. Now in full work
865/04	M	17	Good condition. Two lobes slightly	October 26, 1905	Good ..	Improved. Worked when he could find it.
888/04	M	58	? Two lobes.. ..	November 4, 1904	Good ..	About same. Unable to work.
1011/04	M	20	? No record.. ..	November 27, 1904	Good ..	Improved. Not working.
904/04	M	31	? Bad condition. ? Three lobes	August 5, 1905	Only fair	Not improving. Cannot work.
1078/04	M	31	Two lobes	June 26, 1905	Short ..	Lost ground. Died in six months.
146/05	M	50	Bad. Two lobes and cavity extending	November 13, 1905	Good ..	Stationary. Cannot work.
134/05	M	11	Good. One lobe ..	March 7, 1906	Good ..	Appears to have recovered.
444/05	M	23	Two lobes	May 1, 1906	Good ..	Improved, then stationary. Worked, but had to give it up.
478/05	M	26	Two lobes. ? Cavity. ? Extending	May 10, 1906	Good ..	Improved, but cannot work.
489/05	M	48	Two lobes (one slight) ..	March 7, 1906	Moderate	Losing ground. Worked ten weeks, then ceased
742/05	M	34	Two lobes	April 7, 1906	Workhouse	Losing ground.
1110/05	M	41	Two lobes. Cavity ..	December 4, 1905	Good ..	Improved and worked. Died in one year.
1197/05	M	45	Two lobes	May 10, 1906	Short of food, then good, and eating well.	But losing ground. Cannot work.
760/6	M	38	Two lobes. ? Extending ..	March 24, 1906	Scarce ..	Lost ground.

CLAYTON CASES—continued.

234

Prog. No.	Sex.	Age.	Condition on Discharge.	Date of Discharge.	Food, &c.	Subsequent reports on Patient's Health.
1187/04	M	43	? Good condition. One lobe ..	March 24, 1906	Good, but cannot eat	Not improving. Works two days a week.
1207/05	M	13	Good condition. Lungs improved..	December 5, 1906	Good ..	Improving. Full work.
302/05	M	38	? Two lobes ..	August 22, 1906	Short ..	Losing ground. Worked for a time, then ceased.
1949/05	M	31	? Two lobes. Deficient expansion, both lungs.	May 23, 1906 ..	Good ..	Losing ground. Cannot work.
482/06	M	35	Two lobes. ? Extending ..	October 9, 1906	Good ..	Improving. Lives on pension.
543/06	M	42	Two lobes. Much improved	July 17, 1906 ..	Good ..	Improving. Works full time.
485/06	M	20	Two lobes ..	July 17, 1906 ..	Good ..	Improved. Relapsed. Died in eight months.
931/05	M	39	Two lobes. ? Extending ..	August 21, 1906	Fairly good ..	Did not improve at first, then improved. Works full time.
1000/05	M	35	One lobe ..	October 3, 1906	Good ..	Improving. Full work.
894/04	F	10	No record. In Monsall ..	February, 1905	Good ..	Improved, then slow relapse.
930/04	F	18	No record. In Monsall ..	February, 1905	Good ..	Improved. Now goes to school.
301/04	F	38	Two lobes ..	September 3, 1906	Short. To seek relief	Worse. Unable to work.
531/04	F	20	Two lobes ..	March 7, 1906 ..	Short ..	Losing ground, but working.
187/05	F	37	Two lobes ..	May 3, 1906 ..	Good ..	Gained, then lost rapidly.
930/05	M	7	One lobe. (? Other lung slightly) ..	January 19, 1907	? ..	Quite well. Going to school.
1001/05	F	12	Two lobes ..	July 16, 1906 ..	Appetite poor. Food good	Lost. Gained. Now losing.
1345/05	F	35	One lobe. (? Other lung slightly) ..	May 23, 1906 ..	Good, but no appetite	Losing ground. Work three her.
354/06	F	14	Two lobes ..	December 5, 1906	Good ..	Lost ground. Now improving.

CROSSLEY CASES.

182/05	M	40	Spare. Two lobes	.. ..	September 12, 1905 ..	Very short ..	..	Lost ground. Died.
232/05	M	20	Good condition. One lobe	.. ..	October 28, 1905 ..	Good ..	..	Not improving, but working.
553/05	F	34	Spare. Much spitting. All lobes	.. ..	August 23, 1906 ..	Fair ..	..	Died very shortly.
575/05	M	49	Spare. Cough and three lobes	.. ..	February 27, 1906 ..	Plenty of plain food	..	Rapid loss. Died.
682/05	F	18	Good condition. One lobe	.. ..	December 2, 1905 ..	Good ..	..	Improving. Full work.
818/05	F	18	Good condition. Dull and harsh all over back.	.. ..	October 30, 1906 ..	Good ..	..	Improved, then slight loss. Stationary. Able to work.
759/05	F	20	Spare. Two lobes	.. ..	November 21, 1905 ..	Good, but no appetite	..	Gained. Got married and then lost ground. Died.
784/05	F	38	Good condition. Larynx and one lobe.	.. ..	November 4, 1905 ..	Good ..	..	No cough or spit. Working.
905/05	F	17	Good condition. Two lobes and ? cavity.	.. ..	April 10, 1906 ..	Doubtful ..	..	Stationary, then lost, and died.
1097/05	M	27	Good condition. Larynx and one lobe.	.. ..	September 1, 1906 ..	Good ..	..	Not improving. Spits blood slightly, but working.
840/05	M	32	Spare. One lobe ..	.. ..	January 27, 1906 ..	Good ..	..	No cough or spit. Working.
1135/05	M	24	Good. One lobe ..	.. ..	April 17, 1906 ..	Very poor ..	..	Not improved. Now in Clayton.
1087/05	M	26	Good condition. Spit profuse. Two lobes	.. ..	May 15, 1906 ..	Probably short ..	..	Not improving. Cannot work.
1320/05	M	33	Good condition. Two lobes ..	.. ..	September 11, 1906 ..	Good, but poor appetite	..	Losing ground. Works, but is fatigued.
298/06	F	16	Good. One lobe ..	.. ..	October 23, 1906 ..	Good ..	..	Improving. Full work.
355/06	M	28	Spare. Two lobes	.. ..	September 6, 1906 ..	Good ..	..	Improving. Does light work.
385/06	F	29	Good condition. One lobe	.. ..	June 4, 1906 ..	Plenty of rough food	..	Not improving. Soon fatigued.
405/06	F	19	Good. One lobe ..	.. ..	October 23, 1906 ..	Good ..	..	Improving. Can now work a little.
440/06	F	15	Spare. One lobe involved ..	.. ..	October 16, 1906 ..	Good ..	..	Improving. Full work
472/06	M	44	Spare. Two lobes and extending ..	.. ..	May 23, 1906 ..	Poor ..	..	Worse. Could not work. Died.
1126/04	F	23	Good condition. Two lobes and extending.	.. ..	October 23, 1906 ..	Poor ..	..	Worse. Work tries her.
707/06	F	13	Spare. Larynx and two lobes	.. ..	February 12, 1907 ..	Good ..	..	Worse. Unable to work.
1024/04	F	33	No record ..	.. ..	About February 27, 1906.	Good ..	..	Well. No cough or spit. Full work.

This case was in Monsall in 1904, and subsequently went to Dalmore from Hardman Street. Two cases recently discharged have not been included in the above list.

This Manchester scheme touches subjects of the greatest interest in relation to the respective functions of the Health and the Poor Law Authorities.

Whatever may be practicable in Manchester, a scheme of this magnitude may prove difficult of realisation in localities not so abundantly provided with wealth and generosity as in Manchester. There can be no question, however, that on the view of high infectivity a Manchester scheme, much extended, would be essential were the circumvention of infection contemplated. At Brighton the scheme of voluntary notification administered by Dr. Newsholme has been attended with a very large measure of success quâ notification, owing, Dr. Newsholme thinks, to the fact that the sanitary authority is able, by a short educational residence at the isolation hospital to assist the patients in a practical fashion.

So far no reference has been made to another form of organisation which, were it in existence, might not improbably prove of more value than the agencies already referred to. Were there in operation in this country some great social organisation such as the Compulsory Insurance System in Germany there would by this fact alone be set up a machinery having such an intimate touch with the industrial wage-earner that the selection of early cases, the continued observation of cases discharged from sanatoria, and the provision of suitable employment would be enormously facilitated. I have dealt more fully with this subject in Chapter XXIII. of this Part; and in Chapter II. of Part IV. there will be found an account of the manner in which this great workmen's insurance system has promoted the erection of sanatoria and been associated in point of time with a marked fall in the death-rate from consumption in Germany.

The nearest approach to this condition of affairs in Great Britain is to be found in the Friendly Societies and the Trades Unions, but there is not about these organisations anything approaching the centralisation and co-operation which is to be found in the Workmen's Insurance System in Germany. It has, however, to be pointed out that under the auspices of the Hospital Saturday Fund there has been founded in this country what is known as the "National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis," and that this association has erected a sanatorium at Benenden in Kent, which holds out promise of proving a highly instructive experiment. Some 52 of the beds have already been subsidised by the affiliated Friendly Societies and Trade Unions. In Part II., page 394, there will be found an account of this sanatorium, as also of the economic considerations which have promoted the development of the scheme.

Finally, greater use might be made of the out-patient departments of general and special hospitals were the attendance of advanced cases of phthisis used as a means for searching out early cases through the agency of medical inspectors or trained health visitors.

CHAPTER XXI.

THE VALUE OF SANATORIA AS EXAMINED BY LOCAL DEATH-RATES FROM PULMONARY TUBERCULOSIS.

The number of sanatoria in England and Wales is as yet too small in relation to the population as a whole to justify the expectation that their effect upon the death-rate from pulmonary tuberculosis would be detectable on a chart representing the diminishing death-rate from this disease in the country as a whole.

It is, however, possible that such sanatoria as draw the majority of their cases from any given area may by their influence have already exerted some effect upon the local death-rate, more especially when it is remembered that the saving of even a few lives or even the postponement of a few deaths should exercise some obvious influence upon a chart representing the death-rate of this disease in rates per 10,000 of this population. Moreover, on the thesis of a high degree of personal infectivity of pulmonary tuberculosis it might perhaps be expected that the educational value of a sanatorium should after a few years result in a smaller number of persons contracting the disease, and in the postponement of death in those who have already developed the malady, and who have undergone treatment at the sanatorium.

With the object, therefore, of determining how far any such influence may as yet be apparent, charts have been constructed showing the death-rate from pulmonary tuberculosis in certain counties which contain public sanatoria, serving for the most part local needs.

The charts show for counties the pulmonary tuberculosis death-rate from 1891 to 1905 inclusive, and they consequently afford information as to the behaviour of the disease anterior and subsequent to the erection of the sanatoria. It is obviously of importance to compare the rate of decline of death-rate which took place prior to the opening of the sanatoria with that which has occurred since, and in examining each chart special attention should be directed to this point. It will, of course, be noted that in each case the interval prior to the opening of the sanatorium is considerably longer than that which has since elapsed, but it will, nevertheless, be observed that several of these institutions have now been in operation for over five years, while in one case, that of Westmorland, the seventh annual report has already been issued. With a view to enable further experience to be recorded as the annual figures of the Registrar-General are issued, spaces have been left on the charts for completion of the records up to 1910 by which date a decade of sanatorium experience will have been gained.

It has been thought, too, that a useful purpose might be served by comparing the behaviour of pulmonary tuberculosis in

counties in which there are public sanatoria with counties not possessing such institutions, and accordingly in the charts certain counties have been placed in juxtaposition for comparison.

Thus in the case of Westmorland, a comparison is made with Hereford and Huntingdon—both essentially rural districts; Durham is compared with Northumberland, owing to their obvious similarities topographically and socially; Nottinghamshire with Cambridgeshire and Lincolnshire.

As regards these charts in the case of each non-sanatorium county the statement "no sanatorium" is made against the year in which the sanatorium in the compared county possessing such an institution was opened. It has of course to be borne in mind that these comparisons are only as yet of a very limited value. In the first place the number of county cases treated has been small in relation to the population of the county as a whole, and in the second place the sanatoria have only been in operation for a few years. Furthermore, in the first years of the operation of these institutions, a large number of unsuitable cases have undoubtedly obtained admission to them, and, as has already been seen, the outlook with respect to advanced or otherwise unsuitable cases is an indifferent one.

But on the other hand it may be contended that the sanatorium treatment, if it has had the effect of saving life by cure, postponing death by arrest of disease, or of reducing the spread of infection by education, should have already exerted some obvious influence on the death-rate curve. For example, and as regards Westmorland, it might perhaps reasonably be urged that the treatment during the last seven years of 246 relatively suitable cases of pulmonary tuberculosis, exclusive of all cases remaining less than a month or handicapped by any serious non-tuberculous complications, should have resulted in some diminution in the death-rate from pulmonary tuberculosis in a population of some 65,000. Whether the Westmorland chart does as a matter of fact show any sequent reduction is a somewhat difficult point to determine, having regard to the course of the curve in the pre-sanatorium period. Perhaps it will be the more proper course to leave the question unanswered in the hope that the subsequent returns may shed definite light upon the problem. As matters stand, a study of the curves relating to the other counties leads to hesitation in the expression of any decided opinion. Generally speaking, it will probably be noted that there is a similarity about the oscillations of several of the curves (for instance, those of Durham and Northumberland) whether these relate to counties with or counties without public sanatoria. But it is not apparently possible from the several curves to derive any information as to whether early or advanced cases have preponderated in the several institutions, and, save in regard perhaps to Westmorland, it is not always easy to ascertain from the annual reports what proportion of cases have come from the county containing the sanatorium. With respect to Westmorland, too, it has to be

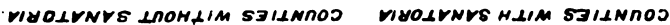
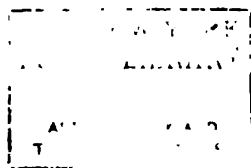


Chart comparing the behaviour of the death-rate from Pulmonary Tuberculosis (per 10,000 of the population) in certain counties with, and certain counties without, Sanatoria from 1881 to 1910.

5



noted that the death-rate from pulmonary tuberculosis at the date of the opening of the sanatorium was one of the lowest, if not the lowest county rate in England, and that generally the rate of fall becomes slower in proportion as the base line is reached. It may, however, be added, as regards Westmorland, that the cure or substantial arrest of the disease in six cases during a year would, *ceteris paribus*, result in a fall of one place in the curve; and seeing that the cases are in some degree selected this is a not improbable event. In the case of the larger counties a considerably greater number of cases would be necessary to make an appreciable influence upon the death-rate curve. For instance, in the case of Worcestershire some 50 cases—as a result either of cure, postponed death or prevention would be thus necessary; in Devonshire 66; in Norfolk 47, and in Nottingham 59. As regards Durham, some 112 cases would be necessary, but it will be noted that in the case of Northumberland (a non-sanatorium county) in which 60 cases are needed to make an impression on the chart, the fall has been greater than in Durham. Probably, however, the safest method of estimating the results of the curative, ameliorative, and educational influence of any given sanatoria is to watch the behaviour of the curve in the same county for a series of years before and after the opening of the institution, and to compare quinquennial rates, remembering of course that as a general rule the tendency of the death-rate is to fall.* It will help the investigator in this sense in the future if in each annual report the number of county cases can be definitely stated.

* The following rates for 1906, which Dr. Tatham has kindly furnished, may now be added to the several charts:—

Huntingdon	...	...	10.4	Warwick	...	...	12.9
Hereford	...	...	8.3	Gloucester	...	...	10.5
Northumberland	...	...	14.8	Dorset	...	...	8.0
Cambridge	...	...	9.7	Somerset	..	...	8.9
Lincoln	...	...	10.1	Suffolk	...	...	10.5
Westmorland	...	...	7.3	Worcester	...	...	8.2
Durham	...	...	12.2	Devon	...	...	11.7
Nottingham	...	...	10.6	Norfolk	...	...	9.4

CHAPTER XXII.

THE INFLUENCE OF "ISOLATION" OF PHTHISICAL PATIENTS
IN WORKHOUSES AND INFIRMARIES UPON THE PRE-
VALENCE OF PHTHISIS.

It is not practicable within the limits of this report to deal at all exhaustively with this subject. But it is necessary to make reference to it, since isolation of phthisis is regarded by individuals whose opinions are worthy of every respect and consideration as a factor of real if not overwhelming importance as conducing to the observed fall in the death-rate from pulmonary tuberculosis. It will, however, be seen that incidentally this question of the value of isolation is approached from several aspects in different portions of this report, more particularly so in the last chapter and in the section relative to the notification of pulmonary tuberculosis. It will be useful, therefore, if in considerations relative to the value of isolation, reference be made to other parts of the volume.

Professor Koch in his notable address at the London Congress of 1901 attributed the remarkable fall which has apparently taken place in the death-rate from pulmonary tuberculosis in this country for so many years past to the *considerable number of special hospitals for tuberculous patients in England*. But, as was pointed out in the Milroy Lectures, in May, 1903, it is difficult to regard these occurrences as instances of cause and effect, seeing that the number of such special hospitals has until quite recently been altogether insignificant compared with the population as a whole in this country, and with the prevalence therein of pulmonary tuberculosis.

The difficulty of accepting Professor Koch's suggestion is, moreover, materially increased by the fact that it is by no means easy to demonstrate from the statistics available any salutary effect on prevalence of such a disease as scarlet fever as the result of the very general isolation of the malady during the whole period of its infectivity. The obstacles in the way of the acceptance of Koch's belief are, too, augmented by an appreciation of the enormous fall in the death-rate from typhus fever which had taken place in this country prior to anything approaching a general provision of isolation hospitals.

Assuming, therefore, for the moment the soundness of the foregoing conclusions as to subordinate influence of hospitals in the case of diseases of such short duration and such admittedly high infectivity as scarlet fever and typhus fever, it becomes difficult to accept the proposition that the segregation of comparatively few tuberculous cases during a small period in each instance of their total infectivity in the few special hospitals which were in existence in this country during the greatest recorded decline

there in the death-rate from pulmonary tuberculosis could have exercised such a phenomenal effect upon the total phthisis death-rate as that claimed by Professor Koch. It has, too, to be remembered that these cases of pulmonary tuberculosis were in the past not so much isolated as segregated with persons suffering from other chest diseases, and that during all this period when the segregation is to be thought of as having exercised its maximum influence no serious precautions to prevent the spread of the disease to the non-tuberculous in such hospitals were being taken.

But, clearly, Professor Koch had been misled as to the facts.

It has since been suggested by Dr. Arthur Newsholme that though the special hospitals for tuberculosis have been few, segregation of phthisical patients in workhouses and infirmaries may nevertheless have been an active force in promoting the fall in the death-rate from pulmonary tuberculosis which has been witnessed; indeed, it is to be gathered from his interesting and painstaking studies in this connection that, while fully admitting that there is still a great deal to be learnt upon the subject, he is inclined to attribute a dominant influence upon the phthisis death-rate to segregation of the disease under Poor Law administration.

Dr. Newsholme adduces in support of his views great wealth of statistical detail, which he marshals with consummate skill, and it is quite impracticable, save by means of a critical examination of the statistical records of many countries to exhaustively deal with the considerations involved. Nevertheless it may be convenient to submit a few observations on this subject.

Certain charts which he has constructed indicate in Dr. Newsholme's view that the fall in the phthisis death-rate which has taken place in certain countries and places is to be attributed to the growing practice of segregating cases of this disease in workhouses, infirmaries and other institutions.

In this connection there can, of course, be no question that the fall in the phthisis death-rate, which according to the official statistics, has taken place in this country has been very largely associated in point of time with an increasing tendency of the sick poor generally, partly through the action of the guardians and partly through their own inclination, to take advantage of indoor relief. But there are also many other practices which have become increasingly prevalent here during the last half century, *i.e.*, during the period in which a notable decline in phthisis mortality has taken place.

The point to be determined, if practicable, is in what degree, if at all, has increasing resort to workhouses and infirmaries, of persons suffering from more or less advanced pulmonary tuberculosis, actually influenced the death-rate from that disease.

Assuming the disease in its advanced phases to be as potent, for harm, as is believed by able and responsible observers it is reasonable to expect that some result in the direction of reduction of mortality from it should have been produced by greater resort of sufferers to Poor Law institutions.

And apart altogether from any result *quâ* prevention, there can be no doubt that the removal from the crowded and poverty-stricken homes of the poor of persons suffering the final phases of a lingering, chronic and disabling malady is a measure of convenience and humanity which is likely in some form or another to be demanded and employed in an increasing degree. In this sense, then, such method of dealing with phthisis may be regarded as a useful philanthropic, and humanitarian measure.

There are, however, serious obstacles in the way of acceptance of a theory that the practice referred to has, as matter of fact, exercised very considerable influence in promoting the fall of the death-rate from pulmonary tuberculosis; and some objections in this sense may be thus summarised.

(a.) This theory assumes for phthisis a degree of infectivity which the evidence available does not in the opinion of many epidemiologists justify.

(b.) No definite effect of the very general and, it may be added, complete isolation—during the whole period of illness and convalescence—of such a highly communicable disease as scarlet fever is conclusively demonstrable. Accordingly it was not to be anticipated that the partial segregation of phthisis along with non-phthisis cases during a small portion only of the whole infectious period of the disease should yield such satisfactory results as those claimed as a result of the process.

(c.) It is not improbable that for a considerable interval prior to the removal of any given patient to an infirmary or workhouse such patient has already exercised the major part of the total influence *quâ* infection of which he or she is capable, a circumstance which, if true, would tend to diminish the influence of segregation in Poor Law institutions.

(d.) The charts furnished elsewhere in this report (Chapter XXI. and Part III.), although purely provisional and preliminary, do not, so far as they go, suggest that segregation is likely to be attended with very obvious satisfactory results.

(e.) If the average duration of stay of the phthisical patient in Poor Law institutions bears any direct relation to the average stay of all patients in such institutions, the total period would hardly seem sufficient for the exercise of a very material influence of such sojourn in preventing the spread of the disease. For instance, during 1897 the average stay, in days, in certain provincial infirmaries was as follows:—Salford, 97; Leeds, 95; Croydon, 86; Birmingham, 74; and West Derby, 60.

A stay of three months or so out of a total infective period of probably very many months, perhaps years, hardly appears likely, having regard to what is known as to hospital influence in scarlet fever, to exercise a very great salutary effect, more especially when it is borne in mind that many workhouse patients go home to die. It would seem, indeed, that the majority are discharged alive to return to their homes, where they have again opportunities for spreading infection.

As Dr. Niven observes, it is necessary to bear in mind the fact that no inconsiderable section of infirmary and workhouse cases have received repeated treatment, and there is no reason to suppose that these persons have produced much less harm at home than they would have done had they not been in hospital. He also points out that as precautions as regards expectoration were not taken until a recent period segregation may not improbably have acted rather in spreading the disease than in reducing it.*

(f.) In New York there were, Dr. Hermann Biggs states, available in 1906, from 2,100 to 2,200 beds chiefly for the care of advanced cases of phthisis, whereas 15 years ago the number of beds specially devoted to this purpose was "scarcely more than a quarter of this number, certainly not in excess of one-third."

It does not appear from a study of the statistics relative to the behaviour of pulmonary tuberculosis in New York, which will be found in the section on Notification (Part III.), that this gradual increase from, say, 700 beds to 2,000 for advanced tuberculous cases, together with the other preventive measures practised in New York under the vigorous generalship of Dr. Hermann Biggs, has materially augmented the rate of fall in the death-rate from that malady.

(g.) As regards Brighton, the chart furnished in Part III. does not suggest that the amount of isolation practised in the fever hospital, together with the educational course with which it has been attended, has, as yet, exercised an easily detectable influence upon the death-rate from pulmonary tuberculosis in that town.

(h.) Apparently Dr. Newsholme takes the view that a patient suffering from pulmonary tuberculosis is only potent for harm as a distributor of tubercle bacilli for a period of 12 months. Doubtless Dr. Newsholme has satisfactory evidence for this belief, but my own view would be more in accord with that of Sir Hugh Beevor, who suggested three years on the basis of his London experience as the duration of the infective period. On this assumption he presented the problem as follows:—

"Let the numbers of the phthisical in institutions be supposed in England now to be 33 per cent., and the length of their stay to be one-

* Dr. Arthur Ransome, too, observes as regards this point "that long before these persons were admitted to these institutions they had been probably for long periods spreading infective material wherever they went."

third of a year : then, if their bacilliferous propensity lasts three years the amount of segregation is only effective to the extent of 3 or 4 per cent. of total bacilliferous propensity of total phthisical population.

"Such a small amount, if such it be, is surely evidence that the detention in institutions and declension of phthisis are not cause and effect. 'An infectious year of illness' is a limitation unknown to me."

I gather, however, from Dr. Newsholme's reply to these comments, that he inclines to the view that the bacilliferous period is probably longer than a year.

(i.) It would not seem that if this thesis of segregation influence be as great as is claimed for it there is any room left for the operation of tuberculous milk and meat.

It may be added, that as regards Shropshire Dr. James Wheatley, the County Medical Officer of Health, has made a suggestive contribution* to this subject. He has shown that probably the deaths from phthisis in all the workhouses of the county during the eight years 1898-1905 amounted to under 6 per cent. of the total deaths from phthisis occurring in Shropshire. It also appears that on December 31st, 1905, there were only seven cases of phthisis in the workhouses, and on December 31st, 1906, only 10 such cases. It is assumed from this that the average number of cases in the workhouses of the county is about 8.5. On the assumption that all these cases are in a more or less advanced condition, and that the average duration of phthisis in this condition is 12 months, the amount of isolation provided by the workhouses for advanced cases is, it is thought, equal to about 3.5 per cent. of the total.

The statistics of the Shropshire workhouses do not enable a decision to be arrived at as to whether the number of cases of phthisis treated in those institutions has increased with the decrease of the phthisis death-rate in the county ; but Dr. Wheatley adds, that if any inference can be drawn from the figures relative to total deaths it would appear that the institutional treatment of phthisis has not increased to any appreciable extent during the last 30 years, and he furnishes the subjoined table showing the percentage of total deaths in the county which have taken place in the workhouses.

Years.	Percentage of Total Deaths in the County occurring in Workhouses.	Years.	Percentage of Total Deaths in the County occurring in Workhouses.
	Per cent.		Per cent.
1871-1875 ...	5.0	1886-1890 ...	6.1
1876-1880 ...	5.3	1891-1895 ...	5.7
1881-1886 ...	6.2	1896-1900 ...	5.9

* Report on Phthisis in the County of Salop, by James Wheatley, M.D., 1907.

In Dr. Wheatley's opinion the figures relative both to phthisis and to deaths from all causes do not support a view that the isolation of phthisis in the workhouses of Shropshire has been the main factor in promoting the fall in the death-rate from phthisis which has taken place.

As regards other institutions he takes the view that the influence of the general infirmaries is negligible owing to the fact that as phthisis cases are only taken in for short periods owing to some complicating malady, the isolation of such cases can exert no appreciable influence in limitation of spread of phthisis in that county.

With respect to the county asylum, Dr. Wheatley shows that during the thirty years, 1856-1885, during which period there was an enormous decrease of phthisis in Shropshire, the amount isolated in the asylum was represented by a little over four deaths a year, less than 1 per cent. of the total phthisis deaths in that period. Finally he is driven to the conclusion that isolation of phthisis in asylums and workhouses has not been a prominent factor in the decrease of phthisis in Shropshire during the last 50 years, and he thinks that such decrease has in the past been mainly due to the increased well-being of the population. In his opinion the figures for overcrowding support this view, as also do the following figures for Shropshire with reference to the phthisis death-rate in both sexes.

Annual Death-rate from Phthisis per 10,000 of the Population in Shropshire.

Period.	Males.	Females.	Period.	Males.	Females.
1856-1860 ...	21.2	24.9	1881-1890 ...	13.6	13.6
1861-1870 ...	20.2	23.1	1891-1900 ...	11.5	10.0
1871-1880 ...	16.4	16.4	1900-1904 ...	10.9	8.5

Decrease in the male death-rate 48.6 per cent.

" " female " 65.9 "

Finally, reference may be made—by the light of some statistics published by Dr. Scurfield, of Sheffield, in his interesting report on the provision of a sanatorium—to the behaviour of pulmonary tuberculosis in that city. From the table there furnished a chart has been constructed showing, by means of two curves, (a) the death-rate from pulmonary tuberculosis per 10,000 of the population of Sheffield from 1876 to 1905, and (b) the percentage of total deaths in Sheffield from pulmonary tuberculosis which have occurred year by year in the Sheffield workhouses.

From this chart it will be seen that from 1876 to 1886, during which time the percentage of phthisis deaths occurring in the workhouse ranged annually from 6 per cent. to 10 per cent. of

the total phthisis deaths in Sheffield, the death-rate from that disease in that town fell from about 24 per 10,000 to about 16 per 10,000. During, however, the latter years of the period referred to in the chart, *i.e.*, from 1895-1905, when the percentage of total phthisis deaths which occurred in the workhouses rose from about 16 to about 28, *i.e.*, nearly doubled, the death-rate from phthisis fell from about 14 to about 11 per 10,000. In other words, when the amount of "isolation" in the workhouse was very small indeed, whether in amount or in kind, there was relatively an enormous fall in the phthisis death-rate, whereas when the amount of isolation there was very considerable the fall in the death-rate was but slight.



These Sheffield figures would not appear to afford support to the view that either "segregation" or isolation in workhouses has been a dominant factor in promoting the fall in the death-rate from phthisis, although here as elsewhere the general statement is true that the phthisis death-rate has fallen while the percentage of total phthisis deaths which has occurred in the workhouses has increased.

I have discussed this theory because, as Dr. Niven observes in his current annual report, it might, if accepted, "lead to a placid trust in the influence of union hospitals which may be unjustified in the issue, and also because we may be induced by the endorsement of this view, if it is incorrect, to overlook cardinal factors in the improvement which has occurred, the recognition of which may guide us onward."

Dr. Niven is unable to accept the view that the great reduction in the phthisis death-rate is due to segregation in the union

hospitals as the dominant factor, and he points out that, in so far as Manchester is concerned, if the three divisions of the city be compared over a long series of years, there is but little improvement in the phthisis death-rate in the Manchester township, the poorest area, in which segregation has been far the most largely employed.

But notwithstanding this and much other negative evidence there would be obvious advantage in removing the advanced and helpless tuberculous sick from their homes, more especially so when the home conditions will not permit the use of a separate room for the patient. Moreover, the continuous presence of a person afflicted with a mortal and disabling malady cannot fail in a large number of cases to diminish the resources and hence the resistance of the other members of the family, thereby rendering the development of an already existing or freshly acquired focus of tubercle bacilli a more likely event than would otherwise be the case.

CHAPTER XXIII.

THE GERMAN COMPULSORY INSURANCE SYSTEM AS A
FACTOR IN THE CONTROL OF PHTHISIS.

It has been shown that pulmonary tuberculosis is very largely a social malady ; that is to say, it is associated with such conditions as overcrowding, unwholesome industries, deficiency of food, abuse of alcohol, &c., each of which is intimately bound up with poverty.

This being so, it is reasonable to suppose that any national organisation having for its object the improved social conditions of the people will be likely, *ceteris paribus*, to exert a beneficial action upon the death-rate from consumption, and more especially will this be likely to prove the case if such organisation has, as it were, a material interest not only in promoting health but also in preventing temporary diseased conditions from becoming permanent.

Notwithstanding the development of the Poor Law system in this country and the great philanthropic resources of the nation, it is not claimed that all the forces combined constitute an organisation which has for its object the systematic *prevention* of ill-health. Rather must it be regarded as a machinery directed more against a symptom of disease than against disease itself. It aims rather at the alleviation of existing poverty, whether temporary or permanent, than at its prevention, while its influence in preventing the disease which is so often the cause of poverty is small.

It may, therefore, prove useful to briefly discuss whether a system of compulsory insurance against disease, which has reached such a relatively high degree of development in the German Empire, is calculated to afford prospects of material assistance, both in the arrest and the prevention of consumption.

With this object in view there is furnished in Chapter II., Part IV., a fairly detailed account of the German Workmen's Insurance System, and of the manner in which such system is regarded by the Germans as being calculated to reduce the prevalence of pulmonary tuberculosis. In this chapter a short summary is alone given, and it is important that reference shall be made to the section in question if it be desired to ascertain the full magnitude of the influence of this far-reaching insurance system upon tuberculosis.

The keynote to the value of this system may be anticipated by a statement of Privy Councillor Bielefeldt, who has devoted much of his life to this important question. He points out that without this workmen's insurance system, the great majority of cases of sickness, invalidity, and old age would bring about

poverty, misery, and economic ruin, for the earnings of the workman in Germany only suffice, as a general rule, for the demands of everyday existence; they do not suffice for the exceptional cases where the activity of the breadwinner ceases temporarily or permanently.

Although the workman is at liberty to profit by private insurance the mass of the working classes do not, for various reasons, thus insure, and Herr Bielefeldt adds that: "The pecuniary assistance afforded by the German workmen's insurance prevents the workman from falling at the mercy of public assistance, which is always imperfect, at a time when his powers do not suffice for the support of his family. It keeps the patient from invalidity and his family from poverty, and does not allow strength already enfeebled by sickness and suffering from still further deterioration owing to insufficiency of food."

It will be conceded that this is a comprehensive programme, and it will be well to outline the organisation for which these claims are made.

In Germany wage earners (with the exceptions detailed in Chapter II., Part IV.) whose incomes are under £100 annually are compelled by law to insure themselves against (1) accident, (2) sickness, and (3) invalidity (and old age). It is sickness and invalidity insurance alone that need here be considered, and an idea of the extensive influence of these two branches of the insurance system may be gathered from the fact that some two-thirds of the wage-earning workpeople in Germany can anticipate with confidence medical assistance and pecuniary relief in case of necessity; and, further, that some 13 out of every 16 wage-earners are entitled to a small pension in case of permanent incapacity either through illness or old age.* In the case of sickness insurance the workman pays two-thirds of the weekly contributions and the employer one-third. Such insurance entitles the insured to adequate relief during at least 13 weeks, and, among other things, in case of incapacity for work a daily allowance of half the daily wage upon which the weekly contribution has been calculated. In certain cases the insured is admitted gratuitously into a hospital while half the sick pay is given to the family. Under some conditions the contributions may be augmented, both as regards amount and duration.

The invalidity statute subjects to compulsory insurance much the same class of persons as sickness insurance, but its scope is wider and it provides pensions for those permanently incapable of work. The weekly contribution varies according to the wage received, the workman and the employer paying towards it in equal shares. The Empire in this case contributes £2 10s. per annum to each pension if, and when, it is received.

* The Progress of the German Working Classes in the last quarter of a Century. By W. J. Ashley, 1904. Longmans, Green & Co., London.

Both branches of insurance have found by experience that their funds are heavily taxed by those of their members who become tuberculous, and each branch has, therefore, paid special attention to this subject.

The banks which administer the relief under the sickness insurance appreciate the fact that it is in their interest to promote the rapid recovery of their sick members, and they have consequently directed their efforts to this end. For instance, the banks are able, with or without the consent of the patient, to send him to a hospital, sanatorium, or elsewhere, and, with the object of promoting the permanent recovery of the patient, the banks are entitled to furnish subventions to convalescents at the termination of the 13 weeks' sick pay to which all members are entitled, such subvention often taking the form of the despatch of the patient to convalescent homes or elsewhere. The subvention in this sense may be continued, if necessary, for a year.

It is unnecessary to emphasise the manner in which a provision such as this is calculated to increase the chances of tuberculous patients being more or less permanently restored to health.

It is, however, mainly the invalidity insurance which has devoted special attention to this subject of tuberculosis, and, as will be seen by reference to Part IV., its influence in this sense is altogether remarkable. It would, in fact, be difficult to over-rate it.

The very active participation of this branch of the insurance system in tuberculosis is no doubt due to the circumstance that, as the organisation charged by the State to provide pensions for chronic invalids, it is materially interested in preventing the creation of such invalids.

Although, as a rule, no pension can be paid until 200 weekly contributions have been made, the authority is able, in cases where it contemplates that invalidity may ensue as a result of existing illness, to take the patient into its own institutions, with the view, if possible, of preventing such invalidity, and although in cases of this nature the usual subvention to the family of the patient is a small one, the invalidity authority may, if the funds allow of it, materially increase such subvention. This is often done in the case of tuberculous subjects, as it is fully recognised that with an insufficient subvention the patients are apt to leave the sanatoria before their disease has been arrested, and that consequently they shortly become charges upon the invalidity funds.

The substantial share which this anti-tuberculous work occupies in the invalidity insurance system will be seen by a reference to the Part IV., where an account is given of the number of patients treated at sanatoria, the expenses of such treatment, and its success.

It will be noted, too, that great efforts are made to correctly diagnose the disease and to secure early cases, as also to prevent

the patient from returning to work too early. To this end some of the patients are sent to convalescent establishments or to agricultural colonies, where attempts are made to accustom them to their former or more suitable work.

It will be seen, too, in Chapter II., Part IV., that the insurance system exercises indirectly a powerful influence on the public health, and that the officers of the insurance agencies pay great regard to the sanitary conditions under which the workmen live. Moreover, by organising lectures and diffusing suitable health literature, they are able to act as educators of the people, and thus to reduce the sickness and invalidity which they have such a material interest in preventing; in a word, they endeavour to prevent as well as to cure.

As regards the influence of sanatoria, whether as curative or preventive agents, it is affirmed by the Germans that they would never have existed had not the insurance institutions furnished the funds and the patients, and this is a claim which may well be seriously considered as regards the general provision of sanatoria in England and Wales. To these facts may be added the circumstance that no less than £6,650,000 has been expended by the insurance agencies in Germany in the construction of wholesome dwellings for the working classes.

This insurance system as a whole must, it seems, exercise a remarkable influence in promoting the health and the social well-being of the German working classes, and, as has been observed in Chapter II., Part IV., the general result must be to raise the German wage-earner into a social class as regards privileges which, without this beneficial system, he would not be likely to occupy.

Such a system must be instrumental, amongst other things, in inducing the working-man to seek medical advice at an early date, and thus to materially assist in the recognition and arrest of pulmonary tuberculosis, and it must also, by its educational value, conduce to the prevention of disease generally.

Although it would be wrong to speak with anything like dogmatism on such a complicated question as the relative values of one or another factor in the promotion and limitation of consumption, special notice may be drawn to the fact that consumption is a social malady, and that this vast German insurance system was brought into existence and has been fostered with the direct object of bridging over, without pauperisation and while promoting the independence of the working classes, the great gap which exists between the rich and the poor. If it be true, as has been suggested by Lord Rosebery, that the real difference between the rich and the poor is that in time of illness the rich have at command all the resources of healing, while the poor often die the direct victims of poverty, it is easy to appreciate how great may have been the influence of this German insurance system in promoting the

decrease in pulmonary tuberculosis which has recently taken place in that country.

Moreover, it is well to bear in mind that the German workman has a legal right to the relief and treatment that he receives. He has himself contributed to the funds during the years of health which he may have enjoyed. This fact, seeing that it enables him to retain both his self respect and his hope, does not produce that depression which is associated with Poor Law institutions, and which is such an inhibiting factor to a successful outcome of sanatorium treatment.

Attention may now be called to the Chart on page 614 of Chapter I., Part IV., where it will be noted that up to about the year 1887 the death-rate from pulmonary tuberculosis was practically stationary in Germany, but that shortly after the introduction of the compulsory sick insurance law a rapid and continuous decline commenced. Having regard to the influences which the insurance system must exercise upon the social condition of the people, it would seem far from improbable that the remarkable fall in the death-rate from tuberculosis may have been very largely promoted by this insurance system, and that there is evidence in support of the statement made by Herr Bielefeldt at the Paris Congress in 1905, that "among all the forces entering into operation in the anti-tuberculosis battle in Germany the German workmen's insurance occupies the foremost place," and that the results which have been achieved are "due for the most part to the therapeutic and prophylactic measures of the German workmen's insurance."

CHAPTER XXIV.

THE EXCLUSIVE RETENTION OF SANATORIA FOR THE
TREATMENT OF "EARLY" AND "SUITABLE" CASES
AND THE RESULTS THEREOF.

THE somewhat super-sanguine expectations which have been entertained as to the value of sanatoria as curative agents have brought about a state of affairs which is reacting inconveniently upon those consumptive patients, who, although they cannot look forward to the absolute "cure" or even "arrest" of their malady, may nevertheless entertain hopes of material amelioration, and not improbably considerable prolongation of life.

In the past cases of this latter type have, as a matter of fact, bulked largely at sanatoria; but the results, which have proved disappointing in view of the expectations encouraged among the public, are now leading to a demand on the part of sanatoria, with the laudable desire of curing or arresting as many cases as possible, for license to limit admission to such patients alone as afford reasonable prospect of "cure," more or less permanent "arrest," or "very great improvement."

Possibly this tendency may have in the future to be somewhat modified when the real facts as regards the value of sanatorium treatment of the consumptive wage-earner have been elicited and public opinion has reached a greater degree of stability upon the subject. It may then be found desirable to group cases under four or more heads in some such fashion as the following:—

- (a) Persons whose disease is likely to be "cured" or "arrested."
- (b) „ in whom material improvement may be hoped for.
- (c) „ whom it is proposed only to educate.
- (d) „ who are admitted as a matter of convenience and expediency for such time as may intervene before death.

Demands are even now being made for more or less separate institutions for each of these groups, and, if it is proposed to approach the matter from the philanthropic standpoint, some such differentiation as this may have to be made.

But in the meantime there will perhaps occur reaction as regards certain institutions with respect to their exclusively curative rôle. In other words some of these institutions may have to be regarded rather in the light in which the general hospitals are viewed, *i.e.*, as institutions for the relief of actual disease and for the prolongation of life as well as, where possible, actual life saving.

In other directions practicability may prove to be the only limitation to differentiation; but the practicable is soon reached by virtue of the fact that the members of each of the groups above referred to are constantly qualifying for other groups either in one direction or another. Cases which, so to speak, to-day are "early" are to-morrow "advanced," and the next "very advanced," while "advanced" cases may occasionally rise in the scale of improvement until they may be ranked for purposes of institutional grouping even with "early" cases.

The actual result of the present practice of sanatoria for the working-classes is that the maximum use is made of the accommodation available for "early" and "suitable" cases, while cases which might materially improve are left to their fate. But in this connection it has to be remembered that until quite recently both early and other cases were, in so far as sanatoria were concerned, left untreated, since no sanatoria were in existence to receive them.

The considerations above referred to serve to bring out inferentially the difference between the rich and the poor as regards their respective ability to secure sanatorium treatment. The rich, no matter how advanced their disease, can always secure such treatment as will afford them the best chances of prolonging their lives: the opportunities of the poor in this direction are but small.

It has, however, to be added, and this further consideration is of importance from an economic standpoint, that although there is this wide divergence between the rich and the poor there is a large number of consumptive persons who belong neither to the one or the other, persons who cannot conveniently make use of the sanatorium accommodation provided for either class. It is persons in this category who are deserving of every sympathy and support, and, except for the King Edward VII. Sanatorium, wherein the charge for accommodation is £2 2s. weekly, and "Pinewood," where a charge of £3 3s. is made, there are few institutions within the reach of persons in the class in question.

There can be no doubt that, slow and uncertain as is progress in matters of diagnosis, advance is steadily being made, and if, perchance, by the employment of the opsonic index or some other method of determining the tuberculously prone, sanatoria are filled with what may perhaps be termed the "pre-tuberculous," the statistical results, both as regards "immediate" and "after-results," should be excellent. In the meantime, however, the actually tuberculous as diagnosed by auscultation, percussion, and the presence of tubercle bacilli in their sputum will be regarded as "unsuitable," i.e., persons for whom the sanatoria were actually erected may find no place within their walls, the rôle of sanatoria having in a sense passed, as it were, from the curative to the preventive.

CHAPTER XXV.

HYGIENE TEACHING IN THE PUBLIC ELEMENTARY SCHOOLS
AND THE MEDICAL INSPECTION OF CHILDREN THEREIN
AS A MEANS TOWARDS CONTROL OF TUBERCULOSIS.

It has been shown in Chapter IV. that the incidence of pulmonary tuberculosis upon the poor is materially greater than upon the well-to-do, and although it is unreasonable to suppose that this extra share of disease borne by poor people can ever be altogether annulled, it is probable that through greater knowledge of the laws of health on the part of the poor and of those who represent them on public bodies it may be substantially diminished.

An important factor, in addition to poverty, which conduces to this disease is ignorance of elementary hygiene, and if by means of a well devised scheme of health instruction in schools the "health-conscience," individual as well as collective, of future generations can be developed, a further reduction in the death-rate from all preventible diseases, and hence, from tuberculosis, is likely to follow.

It will probably be conceded that the money which is expended by the poor upon food is very often laid out in an extravagant fashion from the point of view of nutritive value; and the relation between defective nutrition and tuberculosis is too obvious to need illustration.

Reference may, however, be made to the report of the Committee on Physical Deterioration, before which evidence was given by sundry witnesses as to the extent of "under-feeding" which obtained in certain districts, and as to the number of children who were suffering from malnutrition. The personal equation of the observers was doubtless responsible in large measure for the variations in the estimates given, and there is, no doubt, great difference between one district and another; but the fact remains that there is in many large urban districts a considerable number of ill-nourished children attending the public elementary schools.

It is unnecessary to discuss all the causes which conduce to malnutrition of children, but it would seem probable that if the children in the public elementary schools could be taught in simple language the relative nutritive merits of the commoner foods, they might be in a better position to obtain for themselves and likewise for those later on dependent upon them, better value for their money. In order to educate children in this fashion it would not be necessary to teach them a complicated system of physiological chemistry, or to expend time in an endeavour to explain to them the precise meaning of calories.

It would suffice if the children could be induced to take a *practical* interest in the question, and by offering nominal

prizes for the most economical expenditure of small sums of money in food, stimulating rivalry between children might be promoted.

The older girls might be taught the importance of many factors in conservation of child-life of which they are at present quite ignorant, albeit many of them are likely in the course of a few years to become child-bearers. They might, for instance, be instructed in the more important causes of infantile mortality, the causes of rickets and scurvy, the danger of contaminated milk and of artificial foods. At the present time there is very considerable difference of opinion as to the amount of tuberculosis which is contracted or which actually exists during child-life, and much additional experimental work is necessary with regard to the views of Von Behring and others as to the facility with which tuberculosis may be introduced into the human system via the alimentary canal before the full value of those theories can be gauged. There can, however, be little question as to the importance of health teaching and training as a means of diminishing the incidence of those numerous conditions and diseases which by common consent predispose alike to the resuscitation of a dormant tubercle and to new infection by this malady.

So far as the records of school inspection in this country are available (and the data are as yet extremely incomplete) it would not appear that the danger of infection from child to child at school, even on the most exaggerated notions of infectivity, is a very important factor as regards tuberculosis in child life. This is due partly to the fact that active pulmonary tuberculosis seems, to judge by the data so far available, to be relatively rare at school attendance ages, and partly to the circumstance that young children but rarely expectorate.

The medical inspections of school children which up to the present have been conducted in this country seem to point to the great rarity of recognised pulmonary tuberculosis among school children.

Dr. James Kerr is of opinion that pulmonary tuberculosis is rarely seen in public elementary schools and he suggests as an explanation that an affected child ceases to attend school at an early stage. So far as his experience in the schools of Bradford went cases of suspected pulmonary tuberculosis were seen no more frequently than cases of lupus, whereas tuberculous diseases of the bones and joints were considerably more frequent. As regards pulmonary tuberculosis Dr. Kerr thinks that as a direct evil at school ages it must be regarded as almost negligible. He thinks,

* Tuberculosis in Elementary Schools, by James Kerr, M.A., M.D., Tuberculosis (English), Vol. I., No. 4, July, 1900. See also Dr. Kerr's evidence and statements before the Inter-Departmental Committee on Medical Inspection and Feeding of Children attending Public Elementary Schools.

moreover, that the debilitating conditions which obtain in many instances during childhood predispose to the development of pulmonary tuberculosis later on.

In his annual report to the Education Committee of the London County Council for the year ended 31st March, 1906, Dr. Kerr states that tuberculosis had only given rise to physical defects of marked character in 16 cases and in each of these cases the disease was healed or quiescent. Small as this number is Dr. Kerr thinks that it must be accepted as representing the true state of affairs, as he considers that it is extremely rare for tuberculosis of the joints or bones to get well without leaving behind it some traces of its occurrence.

Notwithstanding the fact that tuberculosis of the joints, &c., is one of the commonest ailments treated in hospital, Dr. Kerr thinks that children who have been thus affected do not attend school, but obtain entry to institutions for cripples, while a large number of them die off from diseases to which tuberculous taints render them susceptible.

It is suggested by Dr. Kerr that the best method of dealing with these bone and joint cases would be by means of invalid schools of rest such as those in the neighbourhood of Berlin, where delicate children are educated so far as their weakly condition allows in the quietude and in the pure air of the forest. There are at present two sanatoria in Germany exclusively for the children; the one at Belzig near Berlin, the other at Hohenlyshen. There are, moreover, several marine stations, country homes and holiday camps. But the French nation has developed this system of marine, mountain and country sanatoria for tuberculous and pre-tuberculous children to a greater extent than any other country, and a visit to Berck-sur-Mer, on the north coast of France, will convey an idea of the magnitude of this development. Here, in addition to several other institutions of a semi-public or private character, the Assistance Publique of Paris has now 1,000 beds available in one institution, an additional 300 beds having quite recently been added to the 700 previously existing.*

Reverting, however, to the prevalence of tuberculosis amongst children actually attending school, Dr. William Robertson, the Medical Officer of Health of Leith, furnishes, in a special report, the results of the systematic inspection of 805 school children. These children were all stripped to the waist in order to facilitate examination but, out of the total of 805, only seven instances of pulmonary tuberculosis were detected, although another seven were regarded as perhaps cases of early phthisis.

There were 41 cases of bronchitis, and it may also be mentioned that there were 110 or 13·66 per cent. of rickets and 61 or 7·57

* When visiting Berck-sur-Mer in September, 1907, I found the additional buildings nearly ready for occupation.

per cent. of spinal curvature, as well as 165 cases or 20·49 per cent. of glandular enlargement.

Useful additional data will also be found in a report of the City of Edinburgh Charity Organisation Society on the Physical Condition of Fourteen Hundred School Children.*

In Berlin during 1905-6 no fewer than 225,337 children came under medical examination. Tuberculosis was found in many cases, but rarely at a stage so advanced as to keep the child from school.

Out of 709 children examined during 1906 by Dr. Wilkinson, Medical Officer to the Oldham Education Committee, 54 were found to be suffering from tuberculosis, and of this number 17 were suffering from pulmonary tuberculosis, i.e., 2·3 per cent.

Dr. Alfred Greenwood examined 1,028 school children at Blackburn and found 121 cases of tuberculosis, 69 of which were pulmonary. It has, however, to be stated that this incidence (6·7 per cent.) of pulmonary tuberculosis upon the children must not be taken as the percentage of all school children but only as the proportion obtained amongst children who for some obvious or suspicious sign of ill-health were referred to the Medical Officer of the Education Committee for examination.

Dr. Myer Coplan† as a result of the examination of 6,679 children attending public elementary schools in the Stroud Union found only three cases of tuberculous discharge.

Other references might be given, but as they do not differ materially from the foregoing, no additional inferences could be drawn from them. It is, of course, not improbable that by greater care in the examination of the lungs of children and the employment of the most modern methods of diagnosis that a larger number of cases of what the French term "closed" pulmonary tuberculosis might be detected. Indeed, there are some indications from other countries that this might be the case. For example, the late Professor Grancher‡ and his school claimed that by devoting special attention to changes in the inspiratory sounds they were able to detect tuberculosis at a much earlier phase of its development than would have otherwise been possible, and if the promise held out by the determination of the opsonic index, by radioscopy and by further developments of the tuberculin test be fulfilled, it is not improbable that tuberculosis may be detected both in adults and in children at an earlier phase than has been the case hitherto.

* The British Journal of Tuberculosis, Vol. I., No. 3, edited by T. N. Kelynack, M.D., M.R.C.P., Balliere Tindall and Cox, London.

† Evidence of Dr. J. M. Martin before Inter-Departmental Committee on Medical Inspection, &c., of Children.

‡ Première étape de la tuberculose pulmonaire diagnostic precoce par l'auscultation, par M. le Professeur Grancher, Congrès International de la Tuberculose. Tome II. Masson et Cie., 120, Boulevard Saint-Germain, 1906

With reference to these finer methods it deserves to be noted that at the Tuberculosis Congress in Paris in 1905, Messrs. J. Rouse and P. Josserand, of Cannes, contributed a paper on the examination of 500 children in the schools of the "Goutte-de-Lait," at Cannes. In this examination special attention was directed to the condition of the apices of the lungs and to that of the tracheo-bronchial glands, radioscopy being enlisted to aid stethoscopy and percussion. These observers claim to have discovered that out of 588 children aged from 0 to 15 years no fewer than 119 had glandular tuberculosis in progress. In addition 144 children had latent tuberculosis. Obviously, further observations are needed before enquiries such as these can serve as basis for generalisation.

Some additional indications may, however, be gathered from the records of post-mortem examinations carried out in certain European countries, which seem to indicate that further research as to the amount of tuberculous lesions at school ages is desirable.

For instance, Nägeli, of Zurich, found at the autopsies of children from 5 to 14 years of age that 33 per cent. showed some tuberculous lesion, while of those between 1 and 15 years of age 17 per cent. were thus affected.

Bollinger, as the result of 500 autopsies made on children from 0 to 1 year of age claims that tuberculous lesions were found in 43.6 per cent.; this tuberculosis was a cause of death in 30 per cent., and latent in 13.6 per cent.

As already pointed out in Chapter V., Professor Ganghofner, in a paper read before the last Tuberculosis Congress at Paris in 1905, stated that during the course of 1,800 autopsies carried out on the bodies of children dead of diseases other than tuberculosis, and who during life had presented no clinical symptoms of this disease, he had found signs of tuberculosis in high proportions in children under 8 years of age.

Dr. A. B. Marfan, of Paris, in a paper on the same subject, concluded :—

1. That in the human species tuberculosis is only exceptionally congenital ; it is nearly always acquired.
2. That at ages 1 to 6 the infant is most prone to risk of contracting tuberculosis.
3. That as regards a considerable number of cases in which tuberculosis manifests itself at adolescence or during adult life, the manifestation is due not to a recent contagion but depends upon an infection latent since childhood.

It is clear from the foregoing observations that there is still very much to be learned as regards the prevalence of one or another form of tuberculosis amongst children at school ages, and the further attention which is likely to be directed to the subject as the result of the medical inspection of school children

should serve to show how far the indications obtained up to the present get justification, or whether tuberculosis is more widely spread than has been apprehended.

Under any circumstances there can be no question as to the importance of the teaching of elementary hygiene, especially in so far as food values are concerned, as a means likely to lead to a reduction in the prevalence of tuberculosis both in childhood and adult life. Such teaching might also comprise reference to the enormous importance of the early recognition and treatment of pulmonary tuberculosis, as practically the two main lessons to be learnt from the foregoing chapters are (1) the necessity, both as regards the prevention and arrest of this disease of its early recognition, and (2) the promotion by all means in our power of improved conditions of living.

Indeed, the considerations discussed in Part I. of this report make it clear that, as Sir Douglas Powell, President of the Royal College of Physicians, has stated, "The prevention of consumption involves a much wider issue than the circumvention of the bacillus."

PART II.

This Section of the Report is devoted to an account of the public sanatoria in England and Wales and, so far as practicable, to consideration of the statistics relative to patients treated therein.

Extensive extracts have been made from successive annual reports of the medical superintendents, with the view of bringing out the problems and difficulties which have from time to time confronted these officers. Such extracts will also serve to show chronologically how initial opinions have in some cases been modified by subsequent experience. The statistical tables have been furnished as completely as space would allow, in order that investigators wishing to collate and analyse such statistics may be able to do so in their own fashion.

There will be found overleaf an index relative to this section of the report.

CHAPTER I.

KEY TO CHAPTER I. RELATIVE TO SANATORIA AND KINDRED INSTITUTIONS.

The counties containing establishments of this character are arranged alphabetically as also are the institutions in each county.

Public sanatoria are alone dealt with in this report, but, as a matter of information, the names of private sanatoria in each county are furnished in *italics* and the approximate number of beds available at each institution given.

County.	Sanatorium.	No. of Beds.	Page.
Bedfordshire ...	" Daneswood " (Woburn Sands) ...	24	265
Berkshire ...	" Pinewood " (Wokingham) ...	60	274
Cheshire ...	Manchester Hospital for Consumption (Bowdon)	50	275
" ...	" Heswall " (Liverpool) ...	21	277
" ...	" Liverpool " (Delamere Forest) ...	40	343
" ...	" Crossley " (Delamere Forest) ...	90	348
Cumberland ...	" Blencathra " (Keswick) ...	28	358
Devon ...	" Dartmoor " (Chagford) ...	8	
" ...	" Devon and Cornwall " (Brent)	85	366
" ...	" Dunston Park " (Paignton) ...	10	
" ...	Mildmay Home for Advanced Cases ...	10	372
" ...	Western Hospital (Torquay) ...	40	372
" ...	" Udal Torre " (Yelverton) ...	18	
Durham ...	" Belle Vue " (Shotley Bridge) ...	20	
" ...	" Durham " (Stanhope) ...	45	373
Essex ...	" Coppin's Green," Clacton ...	20	380
" ...	" Maldon " ...	12	
Gloucestershire ...	" Birmingham " (Cheltenham) ...	40	382
" ...	" Cotswold " (Stroud) ...	33	
" ...	" Painswick " (Stroud) ...	12	
Hampshire ...	" Alderney Manor " (Parkstone) ...	25	
" ...	" Firs Home " (Bournemouth) ...	20	383
" ...	" Hahnemann Home " (Bournemouth)	32	383
" ...	" Home Sanatorium " (Bournemouth) ...	45	
" ...	" Linford " (New Forest) ...	24	
" ...	" Moorecote " ...	15	
" ...	" National Sanatorium " ...	85	384
" ...	" Overton Hall " ...	12	
" ...	" St. Joseph Convalescent Home " ...	72	388
" ...	" Stourfield Park " ...	40	
Ile of Wight ...	Royal National Hospital (Ventnor) ...	155	388
" ...	St. Catherine's Home (Ventnor) ...	12	394
Kent ...	" Benenden " ...	63	394
" ...	" M.A.B. " East Cliff Home " (Margate) ...	130	404
" ...	" Royal Sea Bathing Hospital " (Margate) ...	162	405
" ...	" Victoria Home for Invalid Children " (Margate)	46	409
" ...	" Sandgate Homes " ...		
Lancashire ...	Clayton Vale Small-pox Hospital ...	32	460
" ...	Crossley " Home of Peace " ...	25	410
" ...	Liverpool Hospital for Consumption ...	30	410
" ...	Manchester Out-patient Department ...		
" ...	" Moor End," Sheffield ...	20	412
London ...	" Brompton " ...	312	412
" ...	" City Road " ...	80	414
" ...	" Free Home for the Dying " ...		415
" ...	" Friedenheim Hospital " ...	48*	415
" ...	Home for Consumptive Females ...	23	415
" ...	" Hospital of St. John and Elizabeth " ...	17	416
" ...	" Margaret Street Hospital " ...		417
" ...	" Mount Vernon " ...	140	417
" ...	" St. Joseph's Hospital " ...	48*	420
" ...	" St. Luke's House " ...	28*	420
" ...	" St. Peter's Home," Kilburn ...	12	421
" ...	" Victoria Park " ...	164	421

* Only a portion of these beds are utilised for cases of tuberculosis, but the exact number cannot be given.

County.	Sanatorium.	No. of Beds.	Page.
Middlesex ...	"Northwood"	100	423
Norfolk ...	"The Beeches" (Long Stretton)	6	
" ...	"The Children's Sanatorium," Holt	15	430
" ...	"Kelling"	51	431
" ...	"Mundesley"	19	
" ...	"Southrepps"	7	
Northumberland ..	"Barrasford"	50	447
Nottingham ...	"Sherwood Forest"	30	450
Oxfordshire ...	"Chilterns"	30	
" ...	"Kingswood"	12	
" ...	"Maitland Cottage"	24	456
Somersetshire ...	"Engel Home" (Cheddar)	16	462
" ...	"Mendip Hills" (Wells)	24	
" ...	"Nordrach-on-Mendip" (Bristol)	40	
" ...	"St. Michael's Home" (Axbridge)	41	461
Suffolk ...	"East Anglian" (Nayland)	35	
" ...	"Maltings Farm" (Nayland)	32	462
Surrey ...	"Crooksbury Ridges" (Farnham)	24	
" ...	"Frimley"	108	465
" ...	"Ockley"	8	
" ...	"Whitmead"	20	
" ...	"Woodhurst"	13	
Sussex ...	"Eversfield" (St. Leonards)	55	474
" ...	"Fairlight Hall" (Hastings)	22	475
" ...	"King Edward VII." (Midhurst)	100	476
" ...	"Millfield" (Littlehampton)	100	484
" ...	"Rudgwick"	13	
Wales (North) ...	"Nordrach-in-Wales" (Penmaenmawr)	23	
" ...	"Vale of Clwyd" (Ruthin)	20	
Wales (West) ...	"West Wales"	28	487
Westmorland ...	"Meathop" (Grange)	44	490
Wiltshire ...	"Winsley"	66	516
Worcestershire ...	"Knightwick" (Worcester)	23	524
" ...	"Midland Open-air" (Belbroughton)	20	
Yorkshire ...	"Bradford Poor Law" (Skipton)	33	530
" ...	"Leeds" (Selby) and "Armley Home," Leeds	78	540
" ...	"Hull and East Riding"	30	544

CHAPTER II.

THE SELECTION OF A SANATORIUM SITE	550
---	-----

CHAPTER III.

SOME GENERAL CONSIDERATIONS AS REGARDS SANATORIUM BUILDINGS	557
--	-----

CHAPTER I.

The Public Sanatoria of England and Wales and the Results of Treatment at certain of these Institutions.

THE JEWISH SANATORIUM, DANESWOOD.

(Opened July, 1903.)

This is the only sanatorium in this country which is devoted exclusively to the consumptive poor of the Jewish community. It owes its establishment to the generosity of Mr. and Mrs. Bischoffsheim, who presented it, together with the site on which it stands, to the Trustees of the Jewish Convalescent Home, of which home the sanatorium may be regarded as a branch.

The institution, which stands in its own well-wooded grounds of three acres in extent, is situated at Woburn Sands in a position some 400 feet above O.D. and $1\frac{1}{2}$ miles south of Woburn Sands Railway Station. The site is surrounded by Aspley Woods, which the Duke of Bedford has generously allowed the patients to use for the purposes of exercise and recreation.

The extensive alterations and additions which have been made to the establishment have entailed a total expenditure of upwards of £25,000, and as the total accommodation at the present time (July, 1905) is 24 beds the cost per bed must be regarded as having been in excess of £1,000.

The nucleus of the present building was a previously existing house which has now been converted partly into an administrative block and partly into ward accommodation. Substantial additions have, however, been made to this nucleus in the shape of a well-built kitchen and other accommodations.

What may be termed the sanatorium proper is a new three-storied building for the accompanying illustration of which I am indebted to Dr. Brander, one of the medical attendants. This building faces south-east and is protected from the winds by the surrounding pine trees which flourish in the sandy formation of the neighbourhood.

The larger part of the building is devoted to the 14 beds for males, the smaller to the 10 beds for females. Some of the wards are for two beds, others for one, and the space per bed amounts to about 1,700 cubic feet. Every effort has been made to prevent the accumulation of dust and to facilitate the cleansing of floors, walls, and ceilings, whether in the wards, corridors, or annexes.

Warming is by means of hot water radiators and lighting by electricity, there being a liberal supply of electric light not only in the wards but in the balconies and *liegehallen*. Water is derived from three separate wells sunk in the Greensand formation to a depth of from 130 to 160 feet, the water being pumped by an electric motor to a service reservoir in the roof of the building.

The drainage is disposed of at some considerable distance from the institution by means of a septic tank and bacterial filters.

There is laundry provision on the premises as also facilities for disinfection by means of superheated steam under pressure.

Methods of Admission.

All candidates for admission, who must be of the Jewish persuasion and necessitous, are required to procure a letter of recommendation from a subscriber or Life Governor or some person in known position, and this letter of recommendation together with a report from the medical attendant must be forwarded to the Honorary Secretary of the institution, Miss R. Jacob, 16, St. John's Wood Park, London, N.W. When a vacancy occurs the patient is seen by Dr. P. Horton-Smith-Hartley, the Consulting Physician to the institution, who determines whether the case is suitable from a medical standpoint, *i.e.*, whether the patient is in an incipient stage of the disease and is likely to derive benefit from a sojourn at the sanatorium.

The length of stay in the sanatorium is at least three months, but Dr. Brander thinks that three months is too short, and that four months at least should be spent in the institution if permanent good is to be hoped for. No application for re-admission is entertained until the patient has left for at least six months, except under very special circumstances.

Results.

The sanatorium was opened in July, 1903, and from that date up to December, 1904, seventy-eight patients had been admitted and discharged.

Of this total four left of their own accord or were discharged within three weeks of admission, and these cases are not included in the statistics which follow. The subjoined table shows that out of the 74 cases under consideration 15 were discharged with all signs of the disease "arrested" and 29 in a "much improved" condition. The first annual report adds that if the two foregoing groups are combined it is seen that 44 out of the total 74 cases, or 59·4 per cent of the whole fall into one or other of these two groups. It is contemplated, too, that many of the "much improved" cases will gradually become arrested (provided the conditions of life under which they live on leaving the sanatorium are favourable). The medical report adds, however :—

"With regard to the lasting cure of the cases which leave the Sanatorium as 'arrested' or 'much improved' we desire to emphasize the importance of the after-care of such cases."

"If they are allowed to return to the same unsatisfactory and unhygienic conditions under which they originally developed the disease, there is no doubt that, even if arrested at the Sanatorium, the disease will soon break out again. To effect a lasting cure an attempt must be made to wean them



19650

THE JEWISH SANATORIUM, DANESWOOD.

(To face page 206.)

from the stuffy and ill-ventilated tailoring shops from which so many of them come, and to obtain for them if possible a more open-air occupation, even though this may mean at the commencement a certain diminution of income."

Unfortunately it has not been practicable to procure a record of the after history of most of the cases, and hence the permanence of the "arrest" or "improvement" cannot be accurately gauged.

Table showing the Results obtained on discharge in 74 Cases treated at the Sanatorium from July, 1903, to December, 1904.

The term "Arrest" is used when there was no cough, no expectoration, no fever, and no sign of active disease in chest when the patient left the sanatorium; the term "Much Improved" when, though there was no fever on discharge, and no sign of active disease in the chest, though the patient had gained much weight and was better in every way, yet there was still a slight cough (perhaps only in the morning) and still a little expectoration.

(Number of Lobes Diseased.	A Arrested. 15 Cases.	B Much Improved. 29 Cases.	C Improved. 19 Cases.	D Stationary. 6 Cases.	E Worse. 2 Cases.	F Died. 3 Cases.	Total number of Cases in which 1 or more lobes were diseased
1 Lobe	6 Cases	18 Cases	2 Cases	—	—	—	21
2 Lobes	6 Cases	8 Cases	9 Cases	1 Case	1 Case	1 Case†	26
3 Lobes	3 Cases	5 Cases	5 Cases	3 Cases†	1 Case	—	17
4 Lobes	—	1 Case	3 Cases*	2 Cases	—	2 Cases‡	8
5 Lobes	—	2 Cases	—	—	—	—	2
	Average duration of stay, 108 days.	Average duration of stay, 119 days.	Average duration of stay, 94 days.	Average duration of stay, 53 days.	Average duration of stay, 56 days.	Average duration of stay, 56 days.	

* One case had also lardaceous disease of the kidneys.

† Two of these cases had also tubercular laryngitis.

‡ Death from hæmoptysis, 21 days in sanatorium.

§ One patient died from acute phthisis following severe hæmoptysis, 132 days in sanatorium.

|| One death from cardiac failure, 17 days in sanatorium.

Average gain in weight, 10½ lbs. Maximum gain, 27 lbs.

One man lost 3 lbs., and one woman lost 11 lbs.

The tables overleaf relate to the immediate results secured during 1905 and 1906, the results being stated separately for males and females, and for early and advanced cases.

TABLES SHOWING RESULTS OF TREATMENT DURING 1905.

Table I.—*Showing Results on Discharge of 66 Cases treated in Sanatorium from 31st Dec., 1904 to 31st Dec., 1905.*
 The term "Arrested" is used when there is no Cough, no Expectoration, no Fever, and no signs of Active Disease in Chest.

No. of Lobes Affected.	A Arrested.	B Much Improved.	C Improved.	D Stationary.	E Worse.	F Died.
1 Lobe	33 Cases.	16 Cases.	12 Cases.	4 Cases.	1 Case.	—
2 Lobes	11 Cases	3 Cases..	3 Cases*	—	—	—
3 Lobes	16 Cases	7 Cases..	1 Case ..	2 Cases†	1 Case‡	—
4 Lobes	6 Cases	1 Case ..	6 Cases ..	1 Case†	—	—
5 Lobes	—	4 Cases ..	3 Cases ..	—	—	—
	—	1 Case ..	—	1 Case†	—	—
	Average duration of stay, 124 days. Average gain weight, 17 lbs. Maximum gain in weight, 31 lbs.	Average duration of stay, 126 days. Average gain weight, 16 lbs. Maximum gain in weight, 26 lbs.	Average duration of stay, 128 days. Average gain weight, 14 lbs. Maximum gain in weight, 24 lbs.	Average duration of stay, 146 days. Average gain weight, 6 lbs. Maximum gain in weight, 11 lbs.	31 days, lost 6 lbs.	

* One case complicated with epilepsy.

† One case complicated with cardiac disease.

‡ This case was a pyretic case, was admitted with temperature of over 100° F. † Both complicated with laryngeal disease.

Table II.—*Showing Condition on Discharge of 43 cases of Males only, Discharged from Sanatorium in the Year ending 31st Dec., 1905.*

No. of Lobes Affected.	A Arrested.	B Much Improved.	C Improved.	D Stationary.	E Worse.	F Died.
1 Lobe	21 Cases.	11 Cases.	9 Cases.	2 Cases.	—	—
2 Lobes	6 Cases	3 Cases ..	2 Cases ..	—	—	—
3 Lobes	10 Cases	4 Cases ..	1 Case ..	—	—	—
4 Lobes	5 Cases	1 Case ..	4 Cases ..	1 Case†	—	—
5 Lobes	—	3 Cases ..	2 Cases*	—	—	—
	—	1 Case ..	—	1 Case‡	—	—
	Average duration of stay, 117 days. Average gain weight, 18 lbs. Maximum gain in weight, 31 lbs.	Average duration of stay, 126 days. Average gain weight, 15 lbs. Maximum gain in weight, 24 lbs.	Average duration of stay, 127 days. Average gain weight, 10 lbs. Maximum gain in weight, 19 lbs.			

* One case lost 1 lb.

† Was in 67 days and gained 4 lbs.

‡ Was only in 16 days and lost 1 lb.

§ Both cases complicated with laryngeal mischief.

Table III.—Showing Condition on Discharge of 23 Cases of Females only, Discharged from Sanatorium during the Year ending 31st Dec., 1905.

	12 Cases.			5 Cases.			3 Cases.			2 Cases.			1 Case.		
1 Lobe	1 Case ..	..	..	2 Cases ..	..	..	2 Cases*	..	..	1 Case ..	..	..
2 Lobes	3 Cases ..	..	..	1 Case ..	..	..	..	..	..	..	..	..
3 Lobes	1 Case ..	..	..	..	..	..	..	..	..	..	..	..
4 Lobes
5 Lobes
Average duration of stay, 143 days. Average gain in weight, 14 lbs. Maximum gain in weight, 26 lbs.															
Average duration of stay, 119 days. Average gain in weight, 16 lbs. Maximum gain in weight, 24 lbs.															
Average duration of stay, 153 days. Average gain in weight, 8 lbs. Maximum gain in weight, 4 lbs.															
31 days, lost 6 lbs. Had pyrexia, 102° temp. of over 100° F. on admission.															

* One case complicated with cardiac disease.

Table IV.—Showing Condition on Discharge of Cases admitted with Temperature under 100° F., i.e., Apyretic Cases.

	33 Cases.			16 Cases.			10 Cases.			3 Cases.		
1 Lobe	3 Cases ..	..	..	2 Cases*	..	..	1 Case ..	..	..
2 Lobes	7 Cases ..	..	..	1 Case ..	..	..	1 Case †	..	..
3 Lobes	1 Case ..	..	..	4 Cases ..	..	..	..	..	..
4 Lobes	1 Case ..	..	..	3 Cases ..	..	..	1 Case †	..	..
5 Lobes	1 Case ..	..	..	..	..	..	..	..	..
Average duration of stay, 124 days. Average gain in weight, 17 lbs. Maximum gain in weight, 31 lbs.												
Average duration of stay, 126 days. Average gain in weight, 14 lbs. Maximum gain in weight, 26 lbs.												
Average duration of stay, 127 days. Average gain in weight, 12 lbs. Maximum gain in weight, 24 lbs.												
Average duration of stay, 43 days. Average gain in weight, 3 lbs. Maximum gain in weight, 11 lbs.												

* One case complicated with epilepsy.

† Both complicated with laryngeal disease.

: Was only in 16 days and lost 1 lb.

Table V.—Showing Condition on Discharge of Cases admitted with Temperature of 100° F. and over, i.e., Pyretic Cases.

No. of Lobes Affected.	A Arrested.	B Much Improved.	C Improved.	D Stationary.	E Worse.	F Died.
1 Lobe	—	—	2 Cases.	1 Case.	1 Case.	—
2 Lobes	—	—	—	1 Case	—	—
3 Lobes	—	—	2 Cases	—	1 Case	—
4 Lobes	—	—	—	—	—	—
5 Lobes	—	—	—	—	—	—
			One case in 137 days and gained 13 lbs. One case in 135 days and lost 10 ozs., but otherwise improved.	465 days, gained 4 lbs.	31 days in Sanatorium, lost 6 lbs.	

TABLES SHOWING RESULTS OF TREATMENT DURING 1906.

Table I.—Showing Results obtained on Discharge in 73 Cases Treated at the Sanatorium from Dec., 1905 to Dec., 1906.

The term "Arrested" is only used when there is no Cough, no Expectoration, no Fever, and no active signs of Disease in Chest.

No. of Lobes Affected.	A Arrested.	B Much Improved.	C Improved.	D Stationary.	E Worse.	F Died.
1 Lobe	34 cases.	15 cases.	17 Cases.	3 Cases.	—	—
2 Lobes	15 Cases	5 Cases.. ..	4 Cases.. ..	—	—	—
3 Lobes	18 Cases	2 Cases.. ..	6 Cases.. ..	—	—	—
4 Lobes	3 Cases	6 Cases.. ..	5 Cases.. ..	3 Cases.. ..	—	—
	Average duration of stay, 117 days. Average gain in weight, 15 lbs. Maximum gain in weight, 50 lbs.	Average duration of stay, 103 days. Average gain in weight, 12½ lbs. Maximum gain in weight, 24 lbs.	Average duration of stay, 99 days. Average gain in weight, 9½ lbs. Maximum gain in weight, 25 lbs.	Average duration of stay, 80 days. Average gain in weight, 9 lbs. Maximum gain in weight, 13 lbs.	N.B.—4 Cases were discharged after only 5 weeks' stay as unsuitable.	

Table II.—Showing Results obtained on Discharge in 50 Cases of Men Treated in Sanatorium from Dec., 1905 to Dec., 1906.

	23 Cases.			9 Cases.			12 Cases.			3 Cases.		
1 Lobe	1 Case ..	..	..	1 Case ..	..	..	—	—	—
2 Lobes	2 Cases ..	..	..	4 Cases ..	..	..	—	—	—
3 Lobes	6 Cases ..	..	..	5 Cases ..	..	..	—	—	—
4 Lobes	1 Case ..	..	..	3 Cases ..	..	..	—	—	—
				Average duration of stay, 116 days. in weight, 16 lbs. Maximum gain in weight, 30 lbs.			Average duration of stay, 104 days. in weight, 10½ lbs. Maximum gain in weight, 23 lbs.			Average duration of stay, 80 days. in weight, 8 lbs. Maximum gain in weight, 13 lbs.		
				N.B.—3 men were discharged after 3 weeks' stay as unsuitable.								

Table III.—Showing Results obtained on Discharge in 23 Cases of Women Treated in Sanatorium from Dec., 1905 to Dec., 1906.

	11 Cases.			8 Cases.			5 Cases.					
1 Lobe	4 Cases ..	..	..	3 Cases ..	..	..	—	—	—
2 Lobes	4 Cases ..	..	..	1 Case ..	..	..	—	—	—
3 Lobes	1 Case ..	..	..	1 Case ..	..	..	—	—	—
4 Lobes	1 Case ..	..	..	1 Case ..	..	..	—	—	—
				Average duration of stay, 121 days. in weight, 11½ lbs. Maximum gain in weight, 18 lbs.			Average duration of stay, 86 days. in weight, 10 lbs. Maximum gain in weight, 23 lbs.					
				N.B.—One woman discharged after 3 weeks' stay as unsuitable.								

Table IV.—Of 64 Cases admitted with Temperature under 100° F., i.e., Apyretic Cases.

No. of Lobes Affected.	A Arrested.	B Much Improved.	C Improved.	D Stationary.	E Worse.	F Died.
1 Lobe	34 Cases.	14 Cases.	15 Cases.	1 Case.	—	—
2 Lobes	15 Cases	5 Cases..	4 Cases..	—	—	—
3 Lobes	16 Cases	2 Cases..	4 Cases..	—	—	—
4 Lobes	3 Cases	5 Cases..	5 Cases..	1 Case ..	—	—
	—	2 Cases..	2 Cases..	..	—	—
	Average duration of stay, 117 days, Average gain in weight, 15 lbs. Maximum gain in weight, 30 lbs.	Average duration of stay, 80 days, Average gain in weight, 11 lbs. Maximum gain in weight, 24 lbs.	Average duration of stay, 90 days, Average gain in weight, 9 lbs. Maximum gain in weight, 23 lbs.	Stayed 139 days, gained 1 lb.		

Table V.—Of 5 Cases admitted with Temperature of 100° F. and over, i.e., Pyretic Cases.

No. of Lobes Affected.	A Arrested.	B Much Improved.	C Improved.	D Stationary.	E Worse.	F Died.
1 Lobe	—	1 Case.	2 Cases.	2 Cases.	—	—
2 Lobes	—	—	1 Case*..	—	—	—
3 Lobes	—	1 Case ..	..	2 Cases..	—	—
4 Lobes	—	Stayed 91 days, gained 24 lbs.	1 Case†..	..	—	—
				One stayed 49 days, gained, 12 lbs. One stayed 64 days, gained 3 lbs.		

* Stayed 109 days, gained 8 lbs.

† Stayed 110 days, gained 14 lbs.

By the courtesy of Dr. Brander I was able at the time of my visit to look through the application forms of the 140 cases which had then been admitted since the opening of the institution, and I was surprised to find that a considerable majority of the whole number had been at some other sanatorium or hospital for pulmonary tuberculosis previously to being admitted into Daneswood. In some instances indeed several of such institutions had been attended by one and the same patient. Thus, there were indications that some patients tend to live in hospitals and sanatoria, procuring letters of admission for another institution when the term of their treatment in one sanatorium has expired. I have received evidence confirmatory of this view from patients who have been resident at other sanatoria.

It may be added that there is an "After-care" Committee in connection with this sanatorium, which endeavours to find suitable occupation for patients when leaving the sanatorium.

Dr. Brander informs me that during recent years the patients have been given some employment either inside or outside the sanatorium. The women are employed indoors, and the men also to some extent, while, in addition, the latter work in the garden and are employed in carpentry, boot-mending and tailoring.

He states that the progress of the cases has been much more satisfactory since employment has been introduced. This is in some degree to be attributed to the fact that earlier cases are now being procured, but some of the more advanced cases have also made good progress when work has been given them.

The After-care Committee now works in connection with the Jewish Board of Guardians, there being a secretary who looks after the patients when they leave the sanatorium and, where possible, finds them out-of-door employment.

Some of the patients have emigrated to America and New Zealand, and good reports are received of them. Dr. Brander adds that the After-care Committee have had great difficulty in getting the patients out of the East-end of London, as even when procured suitable employment in the country they tend to return after three or four months. Difficulty has also been experienced with the out-door work at the sanatorium, as the class of patients received at the institution is not well suited for this purpose; but in this respect there has, it appears, been improvement lately.

THE LONDON OPEN AIR SANATORIUM.

(Opened in 1901.)

Although this Sanatorium, which is known as "Pinewood," cannot strictly be regarded as a public institution, the circumstances of its foundation and administration are perhaps such as to merit its inclusion among the institutions with which I am more particularly dealing.

The Sanatorium was founded through the munificence of a few wealthy philanthropists, who, at a cost of £40,000, together provided the site, and the building which affords accommodation for 60 patients.

The institution was intended primarily for early cases of phthisis among persons who, while unable to meet the demands made by most private sanatoria, were nevertheless willing, able, and anxious to contribute in part if not in full to the cost of their maintenance.

The weekly charge per patient is three guineas, a sum which, but for the liberality of the founders in presenting to the Trustees an institution, in regard of which there is no capital charge to be met, would not cover the cost of the accommodation provided.

The site, which comprises 82 acres of pine woods, is situated near Bracknell, in the county of Berkshire, at a point a little to the south-east of Easthampstead Park. It is at an elevation of 220 feet above Ordnance Datum, and is on the Upper Bagshot Sands. The institution is reached conveniently from Wokingham or Wellington College stations.

The Sanatorium proper consists of what is termed a Central Medical Residence, from which a disconnected wing, as shown in the accompanying plan, extends on either side, the general aspect of this group of buildings being south.

Each wing is a two-storied building with 16 rooms on each floor, and at the free end of the wings are *liegehallen* so arranged as to afford shelter from the winds.

The cubic capacity of each room is 1,200 feet; the lighting is by electricity generated on the site, and the warming is effected by steam coils and grate fires.

In the rear of the rooms is a well-lighted and well-ventilated corridor, which also gives access to a small kitchen and to lavatories.

To the north of the Central Medical Residence, but well removed therefrom, is a cheerful and well-constructed dining hall, which is also used as a recreation room, while northwards of this dining hall are the main kitchen and the accommodation for the female servants.

Behind these buildings, and well separated therefrom, is the laundry block, which comprises the disinfecting apparatus, while to the east of this block are the stables and the boiler and engine



THE LONDON OPEN AIR SANATORIUM.

(To face page 274.)

house. In an isolated position still further east is the isolation block, which provides accommodation for cases of the acute exanthemata, should such occur among the patients.

Water is taken from the public supply of Wokingham, and the sewage is disposed of on the site by means of a septic tank and bacteria beds.

The patients, each of whom is provided with a separate bedroom, are under the control of two Resident Medical Officers. Dr. Hector Mackenzie, who was at that time one of the visiting Physicians, was good enough to allow me to accompany him on two of his visits to the institution and to give me much interesting information with regard to it. To Dr. Chidell, a former Medical Superintendent, I am indebted for the photograph from which the accompanying plate was taken.

Patients are strongly urged to remain at the institution at least six months, preference being given to early cases.

No statistics relative to the results obtained at this institution have, I am informed, as yet been published.

Applications for admission are to be made to the Secretary of the London Open Air Sanatorium, 20, Hanover Square, London, W.

THE MANCHESTER SANATORIUM AT BOWDON.

(Opened 1885.)

This sanatorium or hospital is one of the several institutions which Manchester now possesses for the control of pulmonary tuberculosis, there being, in addition to this institution, the Out-patient Department in the city itself, the Crossley Sanatorium in Delamere Forest, the Clayton Hospital for advanced cases, and the Crossley "Home of Peace."

The institution here in question is situated at Bowdon, a Cheshire suburb of Manchester, some nine miles from the city. The area of the site is about one acre, and the subsoil is sand.

Originally affording accommodation for fifteen patients, the number of beds was soon increased to thirty-eight by the liberality of Mr. W. J. Crossley, Chairman of the Hospital, by the addition of two wards. Shortly afterwards, in 1899, the same benefactor provided for an additional fourteen beds by means of two other wards, and the total accommodation is now regarded as being 50 beds.

In 1899 verandahs and *liegehallen* were added, and in that year the systematic out-door treatment was adopted, and an increased dietary scale came into force.

Each patient is accorded 120 square feet of floor space, and nearly 2,000 cubic feet of air-space.

Heating is by hot-water pipes, and lighting by electricity.

The accompanying plate, taken from the annual report, indicates the nature of the building.

For some little time after the opening of the Crossley Sanatorium patients were, in the first instance, sent from the Out-patient Department in Manchester to Bowdon, with the view of ascertaining their fitness for treatment at Crossley, and for the purpose of rectifying any dental or digestive troubles. This practice was, however, not long continued, and at the present time the Crossley patients go direct to that institution.

From 1889 to 1898 the average weekly cost of maintenance at Bowdon amounted to 16s. 2d. per head, but in 1900, owing mainly to the more liberal diet, the cost reached 18s. 6d., the cost during 1902 being 18s. 10d. The duration of treatment is about three months.

As regards results, Dr. Siegmund Moritz,* in the paper referred to in the footnote below, furnishes a table relative to the seven years 1894 to 1900, and, as the open-air treatment commenced in 1899, it is now practicable from subsequent annual reports to attempt a comparison between the results during the six years 1894-1899 inclusive and those which were obtained under six years, 1900-1905, of systematic open-air treatment. This is done in the following table:—

Year.	Total Cases of Phthisis.	Cured or Much Improved.	Improved.	Stationary.	Worse.	Dead.
1894 ...	153	58	66	7	19	3
1895 ...	168	67	57	18	18	8
1896 ...	129	49	37	18	19	6
1897 ...	191	82	65	12	25	7
1898 ...	109	18	46	30	4	11
1899 ...	145	47	52	25	14	7
Total ...	895	321	323	110	99	42
Percentages		35·8	36·1	12·3	11·1	4·7
1900 ...	162	62	71	12	14	3
1901 ...	175	69	75	20	7	4
1902 ...	178	32	116	14	10	6
1903 ...	189	54	51	56	24	3
1904 ...	186	48	58	56	23	1
1905 ...	221	52	92	60	16	1
Total ...	1,110	317	463	218	94	18
Percentages		28·6	41·7	19·7	8·5	1·6

* The Manchester Hospital for Consumption, and its Work, by Siegmund Moritz, M.D., M.R.C.P. (London), Honorary Physician to the Manchester Hospital for Consumption. Transactions of the British Congress on Tuberculosis.



CONSUMPTION HOSPITAL, BOWDON NEAR MANCHESTER.

(To face page 276.)

Dr. Moritz points out in his communication that in 1900, the first year of the open-air treatment and revised dietary, 85·8 per cent. of the patients treated on the verandahs left improved. It must be borne in mind in interpreting the above table that after 1904 Bowdon was to a material degree deprived of the best cases, since these were hereafter sent to the Crossley Sanatorium. In recent years, too, a group of doubtful cases has been introduced, and these having been deducted from the total, the percentages in the first two columns of the 1900-1905 series of years are less than would be the case were this "doubtful" group included. It would seem, therefore, unsafe to draw any inferences from the above table, the disturbing factors referred to having rendered comparison unreliable. There would appear to be no doubt that the improved regime at Bowdon has been attended with good results.

It is important to note in connection with this institution, as also with the Crossley Sanatorium, that all discharged patients are visited at their own homes by the lady visitor, who reports to the Committee as to the circumstances and state of health of such patients. Where necessary, assistance is given to the poorer patients in the form of a daily supply of milk, eggs, and rice. Without this help many poor patients who have greatly improved in health, would soon lose the benefit received during their stay in hospital.

Mr. C. W. Hunt, Secretary of Manchester Hospital for Consumption, has been good enough to send me copies of the annual reports and to furnish me with certain data relative to the several institutions.

THE HESWALL SANATORIUM.

West Derby, Liverpool, and Toxteth Park Joint Hospital,
Heswall.

(Opened October 20th, 1902.)

The institution, the foundation stone of which was laid on October 25th, 1901, by the Right Hon. Walter Long, M.P., then President of the Local Government Board, was erected for the tuberculous sick of the City of Liverpool by the three Boards of Guardians who administer poor law relief within its limits, i.e., by the Boards of Guardians of West Derby, Liverpool, and Toxteth Park Unions, these three Boards having been united for this purpose by an Order of the Local Government Board. In this sense Liverpool has been the pioneer of the Sanatorium movement amongst Poor Law authorities, and consequently the results of the work of this institution should afford a useful indication of the value of sanatoria for tuberculous paupers. I have therefore dealt rather fully with the annual reports with which Mr. Harris P. Cleaver, the clerk to the joint board, has

courteously furnished me. I am also indebted to Dr. Nathan Raw and Dr. J. Ernest Nevins, two of the three medical officers who were until recently attached to the Institution, for assistance in connection with this account of the sanatorium and its work. I have to thank Dr. Hope, Medical Officer of Health, of Liverpool, for the loan of blocks illustrating the buildings.

The sanatorium is situated on an elevated site of 15 acres overlooking the estuary of the Dee, and at a point about $1\frac{1}{4}$ miles to the north-west of Heswall station. It is well sheltered on the east, and commands an extensive panorama of the estuary of the Dee with the Welsh hills in the distance.

The sanatorium, which faces south, consists of a two-storied building, having on either side of the main entrance and on each floor three small wards and one large one. In the rear of each wing is a double-storied annexe cut off by cross ventilation from the main building, each annexe comprising lavatory and bath-room accommodation.

Extending backwards from the centre of the building are the dining room for the patients and the administrative offices.

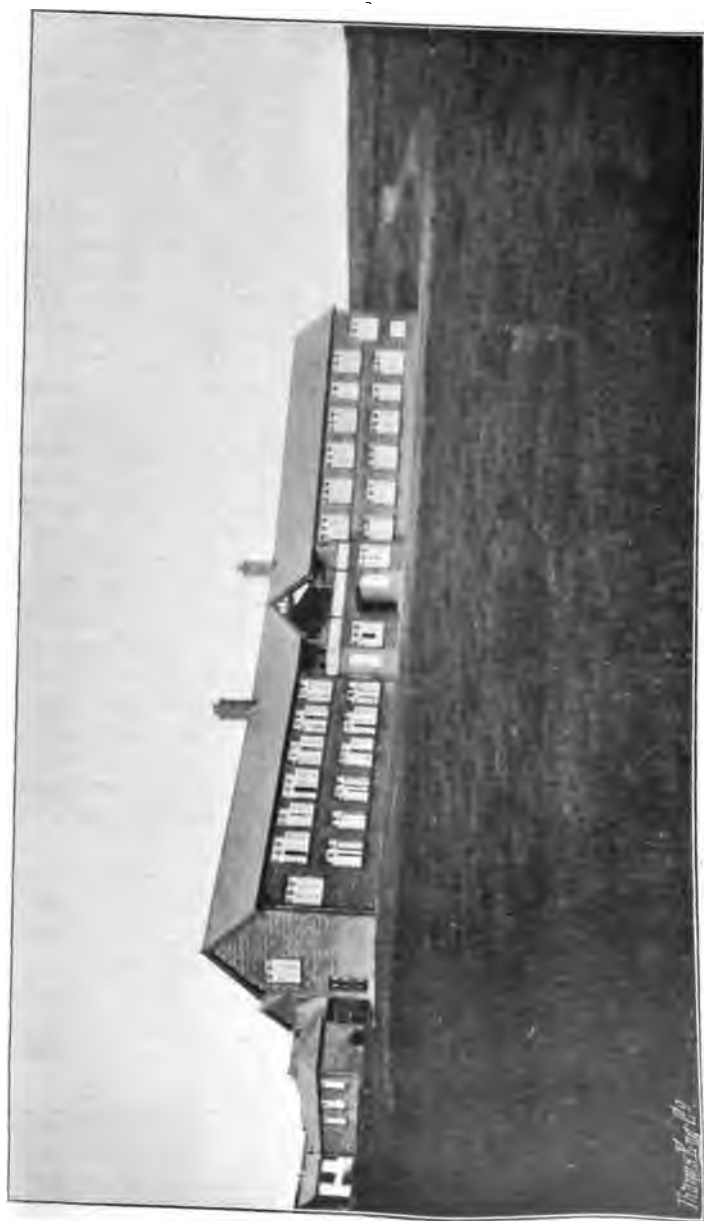
In the centre of the first floor is a well arranged open balcony in which the patients are able to rest in the open air, in a sheltered position, and from which admirable views can be obtained, while running along the front of each wing is a glass-roofed verandah closed at the far end, which acts as a *liegehalle* for the patients. The total accommodation provided is 24 beds, *i.e.*, 12 on either side of the centre, there being 2 wards for 6 patients each, and 6 single-bedded wards. Of these beds, 10 are allocated to West Derby, 10 to Liverpool, and 4 to Toxteth Park. At the rear of the wards is a well-lighted and ventilated corridor, affording access to the wards and to the lavatories, &c. Each wing of the sanatorium is approached by a separate staircase, thus affording means of escape in case of fire, and facilities for the more complete separation of the sexes when males and females are treated in this institution.

Up to the present time (the end of 1906) males only have been admitted, but the sanatorium is constructed so as to afford accommodation for 12 patients of each sex. Each patient is provided within doors with 1,000 cubic feet of air space.

The grounds, which are covered with heather, afford agreeable walks for the patients, and there is also a "shelter" at a point some distance from the sanatorium. There are well-appointed day rooms for the use of the patients.

Water is supplied from the West Cheshire Waterworks.

The cost of the institution, including the price of 15 acres of land, furnishing, &c., was £12,000, an amount which was raised by loan, with the sanction of the Local Government Board. The cost per bed, inclusive of the land, was £500, exclusive of the land, £338, and it is clear that additional beds could be erected at a smaller cost.



HESWALL SANATORIUM. (Front Aspect.)

(To face page 278.)



HESWALL SANATORIUM. (Side Aspect.)

(To follow plate facing page 278.)

The staff comprises a superintendent nurse, a charge nurse, a probationer, and six servants. A charwoman is procured from the village.

Unfortunately, considerable difficulties present themselves in any attempt to deal adequately and fairly with the results of the work of this institution. From a medical standpoint it was administered until 1906 by three medical officers, and there has been divergence of opinion, more especially between two of them, as to the value of the institution and as to the results obtained. Although in a sense this divergence of opinion is regrettable, the fact of such divergence enables a broader estimate of the value of the work to be obtained than might possibly be the case were the institution entirely in the hands of one officer.

At the same time it is extremely difficult to so summarise each report so as to convey an absolutely fair interpretation of the conclusions arrived at by each of the medical officers.

I have therefore determined, notwithstanding the fact that considerable space will be thereby occupied, to reproduce verbatim the annual reports, for the three years during which the institution has now been open, of each of the three medical officers, and I would urge the great importance of consulting these reports. As yet, there are but few Boards of Guardians in this country who have made any special structural provision for the treatment of pulmonary tuberculosis, and therefore, those desirous to do so in the future may probably be glad of having the Heswall reports available for reference purposes.

It is of importance to point out that one of the conditions laid down by the Committee upon the opening of the sanatorium was that any person sent to the institution must previously have been an inmate of one of the three poor law infirmaries, but during 1905, owing to Toxteth Park having no suitable cases in the infirmary, persons in receipt of out-door relief were allowed to be sent to the institution.

As regards the expenditure necessitated by this sanatorium, it will be observed from the clerk's report that in the first year of working the average weekly cost per patient for in-maintenance was 16s. 8½d., and that, including establishment charges, the weekly expenditure amounted to £2 17s. 0½d. per patient.

During the second year this cost for in-maintenance amounted to 18s. 1½d., while the total expenditure reached the sum of £3 weekly per patient.

During the third year the total cost per patient came to £2 19s. 4d. per week, the in-maintenance cost being 17s. 0½d.

During the fourth year the total weekly cost per patient came to £2 8s. 3½d., the in-maintenance cost to 16s. 8½d.

The clerk, however, points out that in so far as this expenditure affects the rates and ratepayers, the whole cost of the institution, as regards West Derby Union, is infinitesimal and hardly calculable, amounting only to 0·12 of a penny, or about

half a farthing in the £ in the second year, and to one-seventh of a penny in the third year. He adds that this charge will no doubt be the same in Liverpool and Toxteth Park, and he thinks that it is unfair to compare the working cost of a large establishment such as a workhouse with a small institution such as the one in question ;—small numbers bring a large average on establishment charges. I would also draw attention to the remarks as to cost which are made by Dr. Raw in his second annual report.

It would be well, too, that the reader should study carefully the observations of the medical officers as to the difficulty of securing early and suitable cases through Poor Law channels; and it will be noted that in the second annual report of Dr. Smart on the Toxteth Park cases, he comments upon the fact that "of the four beds allotted to Toxteth, during the greater part of the summer and early autumn one, and sometimes two, beds were unoccupied." He attributes this to the circumstances that, during the period in question, there were no cases in Toxteth Workhouse Infirmary suitable for sanatorium treatment, *i.e.*, "comparatively young men with early phthisis signs and symptoms who would be likely to derive some permanent benefit by residence at Heswall."

Although I am reproducing the annual reports in full, it may be useful if a brief summary of some of the figures be given, although owing to the variety of terms used it has been necessary for me to group certain of the terms together. All the data from which my tables have been compiled will, however, be found fully set out in the separate annual reports.

I deal separately with the immediate and "after-results" of each year, but as to the after-results, it is necessary to point out that for the most part they refer to cases which have been discharged from the sanatorium for a few months only.

Apparently, however, the separate table relating to the Liverpool cases, which is to be found in the second annual report, refers to all the patients who have been discharged from the sanatorium since its inauguration at the end of 1902, *i.e.*, it relates to a full two years' work. In studying all the tables the above facts should be held in view.

Immediate Results as regards Patients discharged during 1902-3.

Union.	Totals.	Cured.	Arrested.	Much Improved.	Improved.	Slight or no Improvement.
West Derby	14	—	7	1	4	2
Liverpool ...	14	—	3	1	5	5
Toxteth ...	7	—	3	—	3	1
Totals ...	35	—	13	2	12	8

The table furnished by the clerk in his first annual report, and which relates to the condition, in December, 1903, of 34 cases discharged during 1903, may be summarised as follows :—

Address unknown	12
In hospital, infirmary, or bed	4
Little or no improvement	6
Cured, but in infirmary for failing eyesight	1
Improved or much improved	5
About the same	1
Dead	5

34

Immediate Results as regards Patients discharged during 1904.

Union.	Total.	Cured.	Arrested or Re- covered.	Much Im- proved.	Im- proved.	Slightly Improved, Unim- proved or Un- changed.	Trans- ferred for Operation.
West Derby	22	1	6	1	11	3	—
Liverpool...	28	—	4	1	14	8	1
Toxteth ...	8	—	2	—	5	1	—
Totals ...	58	1	12	2	30	12	1

Of the 15 patients "cured," "arrested," or "much improved," the following was the condition at the end of the same year :—

At work	3
Working "on and off"	3
Unable to trace	2
Unable or unwilling to work	1
In hospital or infirmary	2
Slightly better	1
Able to work, but has none	1
Dead (? cause)	2

15

And the table relative to all the 38 patients from the Liverpool Union who have been discharged from the sanatorium since its inauguration up to December 12th, 1904, i.e., during a period of two years, may be summarised as follows, the condition of

the cases having apparently been ascertained at the end of 1904.

In infirmary, hospital, or sanatorium, either more or less permanently or at intervals, either for phthisis or other diseases...						13
Dead of phthisis	...	...	...	...	...	7
Not recently heard of	...	...	...	...	...	5
Disease apparently arrested	...	...	...	...	...	3
Worse	...	...	...	...	...	3
Dead of other diseases	...	...	...	...	...	2
Working and feeling well	...	...	...	...	...	2
Doing odd jobs	...	...	...	...	...	3
						<hr/> 38

Immediate Results as regards Cases Discharged during 1905.

Union.		Total.	Cured.	Arrested or Recovered.	Much Improved.	Improved.	Slightly Improved, Unimproved, or Unchanged.
West Derby	...	19	4	2	4	7	2
Liverpool	...	24	1	—	5	12	6
Toxteth	...	5	2	1	2	—	—
Total	...	48	7	3	11	19	8

Of the 21 cases recorded in the above table as "Cured," "Arrested," "Recovered" or "Much Improved," the after-results at the end of the year during which they were discharged were somewhat as follows :—

In or out-patients at some hospital or infirmary	...	4
Working	...	11
In fair or good health	...	3
Only able to do light jobs	...	1
Fit for work	...	1
Unable to work	...	1
		<hr/> 21

Since the beginning of 1906 the institution has been under the care of a single medical superintendent, Dr. J. B. Yeoman, who lives at Heswall and visits the sanatorium daily. In order, therefore, that the fourth year's work may be compared with that of the first three years, it seems desirable to reproduce verbatim the fourth report. This course is indicated also by the value which must undoubtedly be attached by all students of the sanatorium problem to these data from Heswall.

It will be noted that the classification adopted during the fourth year differed somewhat from that adopted in previous years ; the present grouping is as follows :—

- (a) Recovery with fitness for work.
- (b) Arrest of disease with fitness for a certain degree of work.
- (c) Improved.
- (d) No improvement.

Group (a) comprises those who are fit for any work or condition of life not admittedly injurious to health, and it presumably includes patients in whom there may be “a little expectoration containing, perhaps, tubercle bacilli.”

Group (b) comprises those who are unable to lead a strenuous life and whose work must be specially selected.

Group (c) embraces those whose constitutional symptoms are ameliorated, but in whom probably no dependence can be placed upon their improvement being maintained.

Group (d) includes patients who make no lasting response to treatment or who regress.

The immediate results yielded during 1906 were as follows :—

Union.	Total.	Recovery with fitness for work.	Arrest of disease with fitness for a certain amount of work.	Improved, but no dependence on improvement.	No. improvement.
West Derby...	26	20	3	2	1
Liverpool ...	18	7	5	1	5
Toxteth ...	14	9	2	3	—
Totals ...	58	36	10	6	6

All these cases have been inquired into after their discharge, such discharges having taken place at intervals between December 2nd, 1905, and December 1st, 1906. It will be seen, therefore, that the intervals between discharge and inquiry have in some cases been very short, and in no case has such interval exceeded one year.

I have endeavoured to summarise the after-results of the 46 cases comprised in the third and fourth columns of the foregoing table, i.e., those who on discharge were grouped either under “Recovery with Fitness for Work” or “Arrest of Disease with Fitness for a certain amount of Work” and the results of the analysis are given below under as few headings as practicable.

Working as porters, labourers, conductors, &c. ...	16
Unable to be traced	9
Unable to do hard work	8
In some infirmary or hospital	6
Attending school	2
Unable to work	1
Dead	1
Difficult to classify	3
	<hr/>
	46
	<hr/>

It will be seen from Dr. Yeoman's report that some employment is now being provided for such of the patients as are able to do work, and it will also be noted that Dr. Yeoman suggests that no patients over 45 years of age should be admitted, since the majority of such patients are individuals with a chronic type of phthisis in whom the prospect of a permanent arrest is, he thinks, very remote.

At the end of the report for 1906 there will be found news of eight patients discharged at intervals between May 1903, and November 1905, and there are also letters from four patients.

It has apparently been found a very difficult matter to keep in touch with patients discharged from this sanatorium for any length of time, a fact which is regrettable, seeing how very valuable and instructive for the whole country such data would prove. Probably the migratory character of a considerable section of the Liverpool poor accounts partly for this difficulty in tracing up the cases.

FIRST ANNUAL REPORT.

REPORT BY CLERK.

West Derby, Liverpool, and Toxteth Park Joint Hospital Committee.

14th December, 1903.

The Joint Hospital at Heswall was opened for the reception of patients on the 1st December 1902. From that date up to the present 56 cases (all males) have been admitted for treatment.

I have caused enquiries to be made into the subsequent history of every case discharged from the hospital, and now submit separate statement giving results of those enquiries, during which visits were made to the homes or lodgings of the 34 former patients.

I have also prepared a statement showing the cost of maintaining the hospital during six months ending September, during which period the working expenses would fall nearer normal than the previous period, December to March.

As to whether the results are satisfactory I must leave the Medical Staff, who will give their own report, to judge.

I would, however, like to testify to the vast amount of care bestowed upon the unfortunate sufferers by the Matron, Miss Bateson, the Sister, Miss Foxcroft, and, indeed, every member of the Staff at Heswall, who, it should be borne in mind, have had to work in a most inclement summer, and surrounded by all the difficulties of a recently opened institution.

(Signed) HARRIS P. CLEAVER,
Clerk.

*Report on Patients Discharged from the Joint Hospital
at Henscall.*

Name.	Age.	Trade.	Period in Hospital.	History after discharge.
B. T. ...	14	Carter ...	2 days ...	Gone away—address unknown.
M. J. ...	22	Clerk ...	11 days ...	Died 6th May, 1908.
D. W. ...	33	Dock labourer ...	12 days ...	Died 22nd March, 1908.
C. E. ...	35	Canvasser ...	15 days ...	Admitted Northern Hospital 9th October, 1908, "Dropsy," &c.; still there—not worked since.
B. P. ...	25	Labourer ...	3 weeks ...	Died 5th April, 1908.
M. P. ...	42	Labourer ...	7 weeks ...	Died 15th May, 1908.
C. W. ...	41	Dock labourer	2 months ...	Very little improvement—appetite bad; now in Toxteth Work-house.
W. J. ...	46	Baker ...	2½ months ...	Out of work. Gone back in health last two months but not under medical treatment.
H. J. ...	37	Labourer ...	2½ months ...	Gone away—address unknown.
M. J. ...	16	Newsboy ...	3 months ...	Do. Do.
C. C. ...	40	Dock labourer	3 months ...	Do. Do.
N. J. ...	24	Seaman ...	3 months ...	Said to have returned to the Toxteth Infirmary.
R. T. ...	37	Dock labourer	3 months ...	Gone away—address unknown.
M. R. ...	28	Painter ...	3½ months ...	Do. Do.
I. T. ...	34	Labourer ...	4 months ...	Gone away—address unknown. Neighbours say seems better and able to work.
G. T. ...	30	Labourer ...	4 months ...	No improvement—works occasionally. Lost weight.
N. D. ...	27	Fruit porter ...	4 months ...	Cured. Now in Mill Road Infirmary. Failing eyesight.
G. M. ...	25	Steward ...	4½ months ...	Gone away—address unknown. Neighbours say gone to sea.
B. R. ...	40	Ticket writer	4½ months ...	Gone away—address unknown.
W. H. ...	43	Fitter ...	5 months ...	Gone away—address unknown. Neighbours say was much better.
S. J. ...	32	Labourer ...	6 months ...	Gone away—address unknown.
F. W. ...	47	Carter ...	6½ months ...	Died 9th September, 1908.
D. F. J. B.	36	Tinsmith ...	6½ months ...	Health improved—working pretty regular.
L. D. ...	46	Porter ...	7 months ...	Gone away—address unknown.
D. J. ...	19	Labourer ...	7 months ...	About the same. Working regular in coal yard.
L. T. ...	15	Labourer ...	7 months ...	Much improved. Worked regular as a carter up to a week ago; left then owing to bad cold.
L. D. ...	20	Steward ...	7 months ...	Appetite better, feels much improved.
O. M. ...	25	Labourer ...	8 months ...	No improvement—lost weight.
D. W. H. A.	37	Clerk ...	8½ months ...	In bed since return from hospital. Died 24th November, 1908.
B. J. ...	39	Labourer ...	9 months ...	Not improved. Out of work.
E. A. ...	17	Office boy ...	9 months ...	Improved. Gone sea voyage.
B. R. ...	25	Cattle drover	9½ months ...	Working. Much improved.
M. M. ...	30	Labourer ...	9½ months ...	Slight improvement. Working about 3 days per week in grain warehouse.
B. E. ...	34	Compositor ...	10 months ...	In Mill Road Infirmary since 14th November, 1908. Chronic asthma and bronchitis.

Statement of Expenditure for the Six Months ending September, 1903.

				£	s.	d.	£	s.	d.
In-Maintenance—									
Provisions	...	...	...	293	6	7			
Necessaries	...	...	...	97	0	2			
Clothing...	...	...	...	19	19	4			
Drugs	...	...	...	50	13	5			
Travelling	...	...	...	3	8	2			
							464	7	8
Other Expenses—									
Salaries	...	...	...	288	0	9			
Rations	...	...	...	194	18	4			
Building repairs	...	...	...	32	6	5			
Furniture and property	...	...	...	133	8	4			
Rents, rates, &c.	...	...	...	29	14	8			
Printing, &c.	...	...	...	37	18	10			
Committee and other Expenses	...	...	...	11	11	11			
							727	19	3
Total	...	...	...				£1,192	6	11

This shows the average weekly cost per patient for In-Maintenance to be 16s. 8½d.

If Establishment Charges be added, the average cost amounts to £2 2s. 11½d.

Loan Account paid by the several Boards of Guardians (aggregate)—

				£	s.	d.	£	s.	d.
Instalment	...	...	...	200	0	0			
Interest	...	...	...	190	2	6			
							390	2	6

or 14s. 0½d. per head, per week.

Adding this to In-Maintenance Establishment and Other Expenses, the total weekly average works out at £2 17s. 0½d. per patient.

MEDICAL REPORT.

Liverpool,

10th December, 1903.

We have pleasure in submitting the First Annual Medical Report of the Joint Sanatorium at Heswall.

The building was completed and ready for occupation on 1st December, 1902, and is admirably equipped in every way for the open-air treatment of consumption.

The total accommodation of the Sanatorium is for 24 patients, of which 10 belong to the West Derby Union, 10 to the Liverpool Union, and four to the Toxteth Union.

During the last 12 months 56 male patients have been admitted, the duration of residence varying according to the character of the case, up to a total residence of 12 months in one case.

The original intention of the Sanatorium was, of course, to treat patients in the early or primary stage of the disease, and your Medical Officers would have liked to have carried that intention into effect had they been able, from the various institutions, to meet with a sufficient number of such cases.

Unfortunately the great [majority of the patients suffering from consumption only ask for admittance to a Poor Law Institution when they are unable to work or become destitute, consequently we have all of us been obliged to admit some cases into the Sanatorium which were not strictly in the primary or curable stage of the disease. We hope that in the course of a short time, when the existence of the Sanatorium becomes known, that poor patients will seek admission in the primary stage of the disease with a view to being cured at Heswall.

There is already evidence of that during the past few months, as the character of admissions is decidedly improving, with the result that the patients are making better progress towards recovery.

In addition to this serious difficulty, which we hope will soon be removed, we are met with the fact that several of the patients on their discharge from the Sanatorium are unable to find employment, and are consequently compelled to ask for relief again, not on account of bodily illness but because they are destitute.

We wish to emphasize these points as showing the difficulty of dealing with the poor when suffering from such a disease as consumption.

On the other hand we would like to point out that in many cases the Sanatorium has conferred immense benefit to some of the patients who were treated there. The Tables will show the exact results, and it is satisfactory to know that many are now following their ordinary employment without any appearance of relapse.

The Sanatorium itself has been admirably conducted by Miss Bateson and her staff of Nurses and Servants, and although the grounds are not yet completed, on the whole, with one or two trifling exceptions, the whole institution has worked admirably and smoothly.

We are of opinion that the results of treatment in the Sanatorium have been encouraging, and we look forward to even better results in the forthcoming year.

We are,

Yours faithfully,

DAVID SMART.

NATHAN RAW.

I agree to all that is contained in this report except the statements that there is evidence that the character of the admissions is improving and that the results have been encouraging.

On these points I will send in a separate note.

J. ERNEST NEVINS.

Additional Report by Dr. J. E. Nevins.

With the Tables in the Report I agree, except with regard to the West Derby cases reported as "disease arrested."

There are eight of these; I am of opinion that in six the disease was not arrested when the patients left hospital, whatever may have happened since.

My reasons are as follows:—

Dorothy, Barclay and Mercer had tubercle bacilli in their sputum when discharged.

James Smith had bacilli a month before discharge, and there is nothing in his report to suggest that disease was arrested in one month.

A patient who is expectorating tubercle bacilli cannot be regarded as having his disease arrested.

The sputum in all cases was examined and reported on at the Thompson-Yates Laboratories.

Thomas Laffey was discharged at the end of my month on duty.

David Nolan was discharged 11 days after the end of my month.

I did not find evidence of arrested disease in either case. My report of all these six cases is that they were only "improved."

In the report there are two points with which I cannot agree.

(1) That there is evidence that the class of case is improving.

(2.) That the results are encouraging.

(1.) To suppose that in a year the fame of the Heswall Hospital has spread amongst the pauper population, and that they come more early for treatment seems somewhat fanciful. There have been more cases of late because the cold weather brings in a number of consumptives, but I do not see improvement amongst the genuine pauper class.

(2.) On the second point I do not think the results encouraging. It is quite true that most of the patients have improved under the good feeding and hygiene of the hospital, but it is equally true that most of them will relapse when removed from these good surroundings, and is also true that the great majority of the cases are still consumptives and still sources of danger to their neighbours, or else dead.

As regards the future of the patients the speech of Mr. Malcolm Morris (Honorary Treasurer of the National Association for the Prevention of Tuberculosis) at the opening of the Heswall Hospital represents the opinion of an expert. He said (extract from *Mercury* report of the opening) :— "After the patients were recovered from the first acute symptoms of the disease they (the Guardians) had only completed one portion of the fight. They could not send the patients back immediately to the unhealthy slums or another breakdown would be inevitable, and the patient would again be on their hands."

Also important are the German Statistics, the most complete yet published (Results of the Open-air Treatment of Consumption, compiled at the Kaiserlichen Gesundheitsamte, from material received from the Sanatoria for Treatment of Lung Disease, Dr. Engleman, 1901).

These shew that of the patients discharged able to work 78.9 per cent. were unable to work or were dead four years after leaving the Sanatorium. The report deals with 2,147 patients.

It should always be realised that there is nothing in Sanatorium treatment to cure consumption. The treatment simply puts the patient in the best condition for nature to work a cure if it is able.

The five patients sent from Liverpool last December were chosen because they were not doing well in the town hospital, and it was hoped they might do better in the country. Three are dead, the other two were discharged "improved." One of them has been slowly relapsing since discharge, the other has not reported himself, but I hear he is at work.

Since the beginning of the year only one patient has been sent from Liverpool who was not doing well in the town hospital, and he had to be returned to Brownlow Hill Infirmary.

Undoubtedly the open-air treatment is the best that has been suggested for consumption, but it is not going to diminish that disease amongst the poor till their homes, and habits and incomes have been revolutionised.

I should like to say something about the cases which have been sent in the second stage of the disease :—

West Derby has sent five. Toxteth has not sent any, though one of its cases has passed from the primary to the secondary stage since admission to Heswall.

THE NEW YORK
PUBLIC LIBRARY

ASTOR LENOX AND
TILDEN FOUNDATIONS

Liverpool sent three in its first batch of patients. At that time the Medical Officers of Liverpool and Toxteth had not been informed of any rules as to the cases to be sent.

Since they learnt the rules both of them have carried them out.

I would ask that after the experience of the past year each Medical Officer should be allowed to send the cases which, in his opinion, will give the best results, taking into consideration not only the stage of the lung disease, but also the other diseases from which patients may be suffering, and also their habits, characters, homes and other important points.

J. ERNEST NEVINS.

TABLE 1.

Showing Admissions from 1st December, 1902, to 1st December, 1903.

	Admitted.	Discharged.	In Sanatorium 1st December. 1903.
	56	85	21

TABLE 2.

Showing Chargeability to different Unions.

	West Derby.	Liverpool.	Toxteth.
	21	24	11

TABLE 3.

Showing Results of Treatment (including those remaining in Sanatorium).

Union.	Disease arrested.	Improved.	Not improved.
West Derby	8*	11	2
Liverpool	4	16	4
Toxteth	4	7	—
Total	16	34	6

* Dr. Nevins does not agree with this portion.

Table 4, which relates to the periods during which the several patients were in the Sanatorium, is omitted because information on this point will be found in column 4 of the clerk's summary.

SECOND ANNUAL REPORT.

REPORT BY THE CLERK.

The hospital has now been in occupation for a little over two years, and was first opened on the 1st December, 1902.

Since then 114 cases have been admitted, 93 discharged, and remaining 21.

I submit statement of accounts for the year ended at Michaelmas, 1904.

Receipts.

	£	s.	d.
From West Derby Union	1,249	0	0
" Parish of Liverpool	1,164	0	0
" Township of Toxteth Park	547	0	0
" Bank interest	9	0	0
	<u>£2,969</u>	<u>0</u>	<u>0</u>

Expenditure.

	£	s.	d.
In-maintenance, including provisions, necessaries, clothing, drugs, and conveyance to hospital ...	1,002	7	11
Building, repairs, and furniture and property ...	241	10	8
Other expenses, including salaries, printing, rates, insurance, and miscellaneous... ..	1,290	7	9
	<u>£2,534</u>	<u>6</u>	<u>4</u>

The average weekly cost per head was :—

	£	s.	d.
In-maintenance	0	18	1½
Building and repairs, and furniture and property ...	0	4	4½
Other charges	1	3	4½
	<u>£2</u>	<u>5</u>	<u>10½</u>

In making these calculations I must mention that the number of days of patients' maintenance was as follows for the year :—

West Derby	3,402 days
Liverpool	3,058 "
Toxteth Park	1,268 "
Total	<u>7,728 "</u>

The average daily number in hospital was 21 during the year.

The cost, including everything possible, comes to £3 a week per patient. This may seem large, but in some hospitals of this class £3 3s. 0d. is the ordinary charge.

It is true that in some institutions the charge is less, but such places are largely kept up by voluntary aid.

Taking the financial aspect as affecting the rates and the ratepayers, the whole cost of the hospital as regards West Derby Union is infinitesimal and hardly calculable, amounting only to 0·12 of a penny, or about half a farthing in the £.

This will no doubt be the same in Liverpool and Toxteth Park.

Again, there can be no comparison between the working of a large establishment or workhouse and a small place like the hospital, with a very limited number of beds.

Small numbers bring a large average on establishment charges.

I submit a report of the present condition, surroundings, &c., of patients formerly inmates.

The medical officers will prepare reports for the meeting.

Whatever opinion the Committee may form as to the success of the hospital, it should be remembered that the cases they have to deal with are from the first of the most unpromising class.

In any case the Committee have done their utmost for those who have come under their charge, and nothing that could conduce to the success of the undertaking has been grudged.

The Committee have been ably supported by Miss Bateson, who has been untiring in her efforts for the comfort and happiness of the sick men, and who has shown very high capacity as an administrator, and proved to be an efficient and worthy matron.

HARRIS P. CLEAVER,
Clerk to the Committee.

Brougham Terrace, Liverpool,
9th January, 1905.

MEDICAL REPORTS.

REPORT ON THE PATIENTS OF THE WEST DERBY UNION FOR 1904.

LADIES AND GENTLEMEN,

I HAVE pleasure in submitting my report on the patients sent to the sanatorium from Mill Road Infirmary during the past year.

Thirty-four patients were under treatment during the year, and the accompanying table will show the results of treatment, which in many instances have been most gratifying and encouraging.

Disease arrested.	Improved.	Not improved.	Total.
10	12	2	24
Remaining in sanatorium	...	...	10
Total under treatment	...	...	34

There was no death in the sanatorium during the year. Some of the patients continue at their work since leaving the sanatorium, and report themselves to me at intervals; others have left the neighbourhood and I have lost sight of them.

The sanatorium continues to do the good work for which it was provided.

There has been during 1904 a decided improvement in the character of the admissions, most of them being amenable to treatment, with a corresponding all-round benefit to the patients.

There is a tendency on the part of the public to expect too much from sanatorium treatment, and it cannot be impressed too strongly that the treatment, to give the best results, must be commenced in the early stages of the disease.

The sanatorium performs a humane and economic work amongst the poor. It rescues some from certain death ; it relieves the suffering and prolongs the working life of others ; whilst it isolates them all from their ordinary home surroundings, thus preventing the spread of infection to healthy members of the family.

It also acts as a powerful and practical educational influence, teaching the patients the nature of the disease and the best methods of resisting its attack.

Another and more practical side of the question is the economic one.

It is estimated that one-tenth of the total cost of poor law administration in England is due to tuberculosis.

I have made a calculation and find that tuberculosis amongst the in-door poor of the West Derby Union costs £10,000 a year. There are at the present time in Mill Road Infirmary over 200 beds occupied by patients suffering from tuberculosis, and when one considers that this enormous expense is going on year after year, without any prospect of immediate decline, it must be agreed that it is a wise and statesmanlike policy on the part of the guardians to try and prevent some cases drifting into a hopeless and helpless condition of incurability, by improving and arresting the disease in a sanatorium, and so preventing them becoming a permanent charge on the rates for the rest of their lives.

And moreover, after the initial capital expenditure of the institution is incurred, the cost of maintenance in a sanatorium is not much more than in the hospital, when one takes into account the special food, clothing, and other necessaries incidental to the treatment of consumption.

I have observed very carefully the condition and progress of the patients during the past year, and I consider the results have been quite satisfactory, my only regret being that I have not more beds at my disposal.

In my judgment the guardians of Liverpool are carrying out a wise and humane policy in making a serious effort to diminish tuberculosis amongst the poor of their unions, and by giving those afflicted with the disease an opportunity of cure.

I cannot conclude without expressing my high appreciation of the conduct of the sanatorium by Miss Bateson, the matron, and all her staff.

I am,

Yours faithfully,

NATHAN RAW, M.D., M.R.C.P., (London).

January 6th, 1905.

H. P. Cleaver, Esq.

REPORT ON THE TOXTETH PATIENTS.

TO THE MEMBERS OF THE JOINT HOSPITAL COMMITTEE.

I BEG to make the following report on the Toxteth patients who were under treatment during the year 1904 :—

These numbered 12 in all ; three were in hospital on January 1st, 1904, nine were admitted during the course of the year, and four remain there on treatment at the present moment. Of the four beds allotted to Toxteth, during the greater part of the summer and early autumn, one, and sometimes two beds were unoccupied. This regrettable fact arose from the circumstance that at that period of the year no cases were in Toxteth Workhouse Infirmary suitable for sanatorium treatment. By cases suitable I mean comparatively young men, with early phthisis signs and symptoms, who would be likely to derive some permanent benefit by residence at Heswall. One of the difficulties of Heswall for the last two years has been the finding of suitable cases in our workhouse wards. The cases from Toxteth at present at Heswall represent, to my mind, the class of case most likely to obtain some definite and permanent good from open-air treatment.

I give in detail the story of all the 12 mentioned cases up to the present time, so far as I have been able to trace them.

- (1) Walter Onions, aged 33—Admitted August 14th, 1903 ; discharged January 20th, 1904 ; died in Toxteth Workhouse May 30th, 1904.
- (2) George Allen, aged 36—Admitted June 8th, 1903 ; discharged April 9th, 1904.
Report on discharge—Improved ; gained 1st. 2lbs. in weight.
Report on sputum—T.B. copious.
At present in phthisis wards, Toxteth.
- (3) Joshua Grace, aged 39—Admitted June 8th, 1903 ; discharged January 15th, 1904.
Report on discharge—Improved ; gained 1st. in weight.
Report on sputum—T.B. scanty.
Has not been heard of since discharge.
- (4) James Corlett, aged 33—Admitted February 3rd, 1904 ; discharged June 18th, 1904.
Report on discharge—This man is very much better ; gained 2st. in weight ; physical signs in lungs disappeared.
Report on sputum—T.B. scanty.
Note.—I advised this man to return to the Isle of Man, his native place, and seek out-door employment. I look upon him as *cured*.
I have heard no news of him.
- (5) Robert Sloan, aged 31—Admitted October 30th, 1903 ; discharged June 1st, 1904.
Gained 8lbs. ; improved. T.B. scanty.
In Toxteth Workhouse, suffering from debility. No physical signs of phthisis.
- (6) William Hickton, aged 28—Admitted January 15th, 1904 ; discharged February 29th, 1904.
Report—Gained 10½lbs. Disease arrested. No T.B.
This man was a case of early phthisis, and left the hospital because he was discontented.
Working when last heard of.

- (7) Thomas Ingham, aged 34—Re-admitted April 8th, 1904 ; discharged August 15th, 1904.

Gained 13lbs. in weight. No T.B.

This man was previously in Heswall—March 11th, 1903, July 14th, 1903 ; gravitated to Toxteth Workhouse ; thin and emaciated ; unable to find employment. There were definite signs of phthisis, but he had a few T.B. in his sputum.

Believed to be working.

- (8) Richard Fowler, aged 22—Admitted August 17th, 1904.

Gained 2st. No T.B.

He is at present in Heswall, and I consider that in another two months he will be discharged *cured*.

- (9) Joseph Armitage, aged 24—Admitted October 28th, 1904.

Gained 5½lbs. ; improving rapidly. No T.B.

- (10) Frederick Wilbraham, aged 19—Admitted June 3rd, 1904.

Gained 8lbs. T.B. absent. This man is *cured*.

- (11) George Cribbin, aged 20—Admitted October 17th, 1904.

T.B. present, moderate ; lost ½lb. since admission. Improving

- (12) Richard Unsworth, aged 48—Admitted March 11th, 1904 ; discharged August 27th, 1904.

Report—No T.B. Improved.

Summarising these results, we have in the 12 patients :—

1 dead.

2 in the workhouse hospital.

1 not heard of (Grace).

(Note.—No news since discharge.)

4 *cured* (Ingham, Hickton, Corlett, and Unsworth).

At present at Heswall 4—of which 1 *cured*, 2 improving rapidly towards *cure*, 1 doubtful.

The hospital is in excellent condition, and the whole surroundings are most satisfactory. I cannot imagine a nicer hospital or a more perfect spot for a sanatorium.

From Miss Bateson and nursing staff I have received every assistance, and I beg to tender them my warmest thanks.

DAVID SMART, B.Sc., M.B.

Visiting Medical Officer, Toxteth Workhouse.

January 7th, 1905.

LIVERPOOL CASES, 1903-4.

In submitting the Second Annual Report of the Liverpool cases I regret to have to record disappointing results.

The patients have in all respects been very much the same as those sent during the first year.

Number of patients from 1st December, 1903, to 30th November, 1904 :—Admitted, 24 ; discharged, 24 ; in sanatorium, 8.

One patient was admitted and discharged twice, and another was admitted once and discharged twice during the year, making :—Admissions, 25 ; discharges, 26.

10 NOVEMBER 25TH, 1904.

quent Result.

August, 1903, for Kidney Disease and Phthisis.
Fatal last, 17th August, 1901.

Infirmaries for Phthisis.

Disease apparently still arrested. Has been
Liverpool Infirmary, 1st December, 1904.

15th August, 1903, for semi-starvation. Not
several times for another disease. Phthisis
15th October, 1904.
Phthisis.

26th March, 1904, for Phthisis. Still in, 1st

Phthisis.

Phthisis.

Phthisis.

July, 1904.

1st August, 1904. Still in, 1st December, 1904.

Took discharge from there, September, 1904,
than on discharge. Out of work. No money.
Disease apparently arrested.

Heart, due to general debility. Apparently
yes. Re-admitted Liverpool Infirmary, 17th
April, 1904.
Infirmary, 4th August, 1901, for Phthisis.

Done odd jobs since discharge.

Done two days' work since discharge.

Done any work since discharge.

Disease, accelerated by drink.

Has been out and in since.

1st September, 1904. Has been out and in
15th August, 1904. Still in, 1st December, 1904.

Free. Short of food.

For operation. Sent back to Heswall, 14th
15th November, 1904. Still in, 1st December, 1904.
Working; feeling well.

Still in, 1st December, 1904.

Working; feeling well.

1st December, 1904.

11
12
13
14

15
16

17
18

19
20
21
22

23
24
25
26

R 1ST, 1903, AND DECEMBER 12TH, 1904.

Any history since leaving Hospital.	Visiting Officer's Report.
Is ill at home	Feels better, but still has cough ; was two months idle, then went down Mediterranean for two months ; has done nothing last five weeks. Clean surroundings, and follows treatment.
.. .. .	Has been working in a forge for last three months ; says he feels much improved in health, and has good appetite, but is still troubled with cough. Clean surroundings.
Came frequently to visit us after discharge ; last time about August ; was always in splendid health.	Is employed as night-watchman at the docks ; unable to do a hard day's work ; complains of pains in the side and bad cough, but is better, if anything. House clean, and he follows treatment as far as possible.
Since died in Mill Road Infirmary.	Was home for ten days, then went to Mill Road Infirmary ; died there 10th October, 1904—Tuberculosis.
Going well when last heard of.	Has been working off and on ; has lost weight but feels generally about the same ; still troubled with cough. Clean surroundings, and follows treatment.
Heard nothing, except that he has left his situation — viz., City Hospital, Old Swan.	Went straight back to his employment as porter at Fever Hospital, Mill Lane ; was there for three months ; been doing photography since ; feels much better ; cough gone, and appetite good. Clean surroundings.
.. .. .	Unable to trace.
.. .. .	Unable to trace ; when last heard of was going to sea on a long voyage.
To Mill Road for artificial limb only ; we understand he is fairly well, working just a little.	Has done no work since leaving Heswall ; says unable to work ; feels worse, and wishes to re-enter Mill Road.

DECEMBER 1ST, 1903, ENDING DECEMBER 12TH, 1904.

History since leaving Hospital.	Visiting Officers' Report.
heard nothing	Has done no work since leaving Heswall; says unable to do any, but has felt better this last fortnight; still has bad cough. House is clean, and he follows treatment.
Has good work; came over in September; was very well indeed; still well.	Works regularly at the docks, but is still troubled with slight cough, but feels much improved in health; has good appetite; surroundings fairly clean.
Has been in Mill Road, but do not know if there now.	In Mill Road for last few weeks with Phthisis.
Discharged to Mill Road; had attack of Jaundice.	Unable to trace.
Wrote to Sister recently; is very well indeed.	Is slightly better but still complains of pains in stomach, and cough; has not attended school since leaving Heswall; seems a delicate boy.
heard nothing	Does an odd day's work labouring now and then, but feels much worse; lives in very poor surroundings, only one room for himself and wife.
Left at own request; peculiar temper. "S," is an alias.	Has been in Mill Road and Brownlow Hill since; does no work; feels worse and complains of gastric stomach.
Died at home, on Nov. 12	Died at home, 12th Nov., 1904. Seem to get gradually worse since return from Heswall.
heard nothing	Since leaving Heswall was in the Consumption Hospital, Mount Pleasant, for two months and is being sent there again; says unable to work.
Went abroad; came home with Malaria.	Did nothing for five weeks, then went trip as sailor to West Indies, contracted Malaria, and now feels much worse; only able to do occasional job.
Discharged, because of wife's illness; not well; tells Sister he would like to return here.	Has sitting occupation turning steam winch at the docks; had relapse, spitting blood three weeks ago; has been gradually losing weight. Clean house.
Keeping pretty well ..	Is able to do work but unable to find any; chest is still bad but feels much improved, sleeps and appetite good. House fairly clean.
heard nothing	Works regularly coaling for White Star Line; is still troubled with cough but considers he is fairly well cured. House clean.

R 1ST, 1903, AND DECEMBER 12TH, 1904.

Any history since leaving Hospital.	Visiting Officer's Report.
This patient has been re-admitted in 1904.	Works regularly at the Docks, and feels better, but is still troubled with cough. House is poorly furnished and unclean (4h. 14ct. Eldon Street).
Returned to Brownlow Hill.	Died in Brownlow Hill, 9th February, 1904—Tuberculosis.
Did well for some time after discharge, then died (from some other cause, I believe).	Was out about nine weeks, getting gradually worse, and troubled with giddiness and weakness; had an accident, result of fall, and was taken to Royal Infirmary, and from thence to Brownlow Hill, where he died, 10th August, 1904.
In Brownlow Hill Infirmary.	In Brownlow Hill since 1st August, 1904—Tuberculosis.
Pretty well, but has no work.	Unable to trace.
Was in Brownlow Hill recently.	In Brownlow Hill—Phthisis.
Has been to see Dr. N., and is doing very well.	Works regularly; about the same weight, but feels improved; sleeps well, and has good appetite; follows treatment, and lives in clean house.
Fairly well, but has no work.	Does occasional day's work at the Docks, but is unfit for hard work regularly; still has cough, but feels improved; lives in lodging house, 121B Islington.
Worked for some time and kept well, but not so well lately.	Unable to trace: went as waiter to Blackpool for the summer; is doing nothing now; was seen two weeks ago, when he said he felt about the same.
Not heard of	Unable to trace.

1903, AND DECEMBER 12TH, 1904—continued.

Any history since leaving Heswall.	Visiting Officer's Report.
Was very well for a time; not quite so well since; is working.	Since leaving Heswall has worked at a tanyard; feels slightly improved, but still has bad cough.
In Brownlow Hill Infirmary now.	In Brownlow Hill.
Well, but has no work; lost 6lbs.	In Brownlow Hill.
.. .. .	Has been working fairly regular at the Docks; had bad cold after leaving Heswall, but now feels slightly better.
.	See report, 3rd sheet.
Doing well	Unable to trace.
s in Brownlow Hill Infirmary now.	See report, 4th sheet.
s in Brownlow Hill Infirmary now.	Still in Brownlow Hill.

, AND DECEMBER 12TH, 1904—continued.

History since leaving Hospital.	Visiting Officer's Report.
n Mill Road. Was Brownlow Hill, but his discharge.	Unable to trace.
ng, and doing y well.	In and out of Brownlow Hill.
ned to Brownlow	In Brownlow Hill.
but has no work ..	Unable to trace.
ownlow Hill In-ary.	In and out of Brownlow Hill.
afterwards re-itted.	In Brownlow Hill.
.. .. .	Died in Brownlow Hill, 4th December, 1904. Phthisis.
nce died	Died 13th August, 1904, result of fall through window while a patient in Netherfield Road Fever Hospital.
been ailing ever e — not able to nd school.	Is about the same, has not attended school yet; hopes to be better when weather is warmer; is running about, decently clad, and is well looked after by his grandmother.
een heard of. We orstood he went to iam.	Unable to trace.

[The page contains extremely faint, illegible horizontal lines suggesting a document or form.]

1903, AND DECEMBER 12TH, 1904.

History since leaving Hospital.	Visiting Officer's Report.
Patients say he is pretty well, and king. Heard from S. that he was not well, some little after discharge.	Died at home, 3rd September, 1904—Phthisis. He began to fail gradually from about three weeks after leaving Heswall.
in Toxteth Infirmary. Heard from about a month after discharge, was well; could only do very little work.	In Toxteth Infirmary since 18th August.
in Toxteth Infirmary.	Died in Toxteth Infirmary—Phthisis.
.. .. .	Was home for eight weeks, then went into Toxteth to be operated on for Piles, remained there for five weeks, then came out for seven weeks and went in again until 14th December, 1901, with bad chest. Says unable to do anything but light work; has no employment at present. House fairly clean.
He was considered to have improved in Toxteth Infirmary before sending	Unable to trace.
He had been at home before Heswall; did well there, relapsed; thought of going to Isle of	Unable to trace.
at sea. His wife told some of the others that he is well.	Has been gone on voyage to West Indies since 1st December. His wife said he was much better, but still troubled with a cough.
a re-admission. relapsed before insufficient food.	Has been in bed for the last week. Has only done an occasional day as Insurance Agent; feels worse and weaker; his cough is bad. House is very clean.

DEM

ant

been

pio

any

sent

S
N

for nu
modern

modern
anty

amer

sent

sent

anty

de 13

Re
No

modern

DECEMBER 12TH, 1904.

Sputum Report.	Date of Admission.
June 28—T.B. scanty. July 29— " absent. Aug. 11— " considerable.	Sept. 2—T.B. copious. Nov. 3— " " Dec. 7— " "
June 28—T.B. scanty. July 29— " absent. Aug. 11— " very scanty.	Sept. 2—T.B. moderate. Nov. 3— " considerable. Dec. 7— " moderate.
July 29—T.B. absent. Aug. 11— " few. Sept. 2— " copious. " 30— " present.	Nov. 3—T.B. copious. Dec. 7— " scanty.
Sept. 2—T.B. scanty. " 30— " "	Nov. 3—T.B. absent. Dec. 7— " "
scanty. " "	Nov. 3—T.B. moderate. Dec. 7— " "
absent. " "	Nov. 3—T.B. absent. Dec. 7— " "
Nov. 3—T.B. absent.	Dec. 7—T.B. absent.
copious.	Dec. 7—T.B. moderate.
scanty.	Dec. 7—T.B. moderate.
absent	Dec. 7—T.B. moderate.
Sept. 30—T.B. few. Nov. 3— " scanty.	Dec. 6—T.B. moderate.
air number. moderate.	Nov. 3—T.B. absent. Dec. 6— " scanty.
moderate. scanty.	Nov. 3—T.B. considerable. Dec. 6— " absent.
numerous.	Dec. 6—T.B. scanty.
absent.	Dec. 6—T.B. absent.
absent.	Dec. 6—T.B. absent.
scanty.	Dec. 6—T.B. scanty.
from 13 to Dec. 6—T.B. always absent.	
Sept. 30—T.B. absent. Nov. 3— " scanty.	Dec. 6—T.B. absent.
scanty.	Dec. 6—T.B. moderate.
moderate.	Dec. 6—T.B. absent.

Results of treatment, including the patients still in the sanatorium :—Disease apparently arrested, 4 ; improved, 23 ; unimproved, 7 (of whom 1 was not in long enough for any change).

These are the results of the year's working as judged at the time of discharge ; but they are of no use in estimating the real value of sanatorium treatment. For that it is necessary to have the subsequent results :—

Of the four "arrested" cases, two have relapsed, a third has died from the secondary effects of phthisis, and the fourth has died from another disease.

The results of the two years' working are as follows :—38 Liverpool patients have been discharged, of whom 8 have not reported themselves, or have been discharged too recently to show results. Of the remaining 30—26 have either died of phthisis, or have been re-admitted to the Liverpool Infirmary, or are in failing health outside from that disease ; 1 has died from kidney disease, accelerated by drink ; 3 have still their disease apparently arrested, and of these 1 has been in the infirmary several times for another disease.

Thirty-eight patients discharged :—Arrest continued, 3 ; died, 9 ; re-admitted to infirmary, 16 ; in failing health outside, 2 ; no report, or recently discharged, 8 = 38.

The factors which produce these disappointing results are mainly two :—(1) Few patients of the parish class in an early stage of phthisis apply for treatment of their disease, and of those who do, few are willing or able to submit to the restrictions of sanatorium life, with the necessary long absence from their families. (2) On discharge from the sanatorium they are obliged to return to the conditions of poverty, bad sanitation, and unsuitable occupation from which they came.

As regards the general working, the Liverpool patients have behaved better this year than they did last, but still they need a good deal of managing, and Miss Bateson and her staff are to be congratulated on their skill in this matter, and on the way in which they have conducted the sanatorium.

Regarding the tubercle bacillus test.

It has been said that better results would be obtained if patients were admitted without waiting for bacilli to be found in the sputum. It is a regrettable fact that in some cases, when the disease is sufficiently advanced for its presence to be definitely proved, it has passed the favourable stage for cure ; yet, without definite proof of the presence of the bacillus, many patients may be called "phthisical" on insufficient evidence, and any statistics founded on unproved cases are apt to be fallacious and lead to a useless spending of money.

None of the Liverpool patients sent to Heswall have suffered by the enforcement of the test.

Regarding the number of patients sent.

Liverpool has not been able to fill its beds with fairly hopeful cases during the year, and the figures given above show that, even with the selected cases sent, the results have not been satisfactory. I would recommend that the bacillus test be continued in all cases of tubercular disease of the lungs (phthisis), and that Liverpool should be allowed to send cases of tubercular disease in other parts of the body, joints, &c., in which there will not be any such test.

Appended is a detailed statement of the Liverpool patients discharged during the past two years.

J. ERNEST NEYINS.

THIRD ANNUAL REPORT.
Year ended 30th November, 1905.

REPORT BY THE CLERK.

THE Hospital has now been in occupation for a little over three years, and was first opened on the 1st December, 1902.

Since last report 52 cases have been admitted, 50 discharged, and remaining at end of the year, 23.

I submit a statement of accounts for the year ending Michaelmas, 1905, as follows:—

Receipts.

	£	s.	d.
From West Derby Union... ..	791	0	0
" Parish of Liverpool	772	0	0
" Township of Toxteth Park	367	0	0
Miscellaneous receipts	7	9	4
	<u>£1,937</u>	<u>9</u>	<u>4</u>

Expenditure.

	£	s.	d.
In-maintenance, including provisions, necessaries, clothing, drugs, and conveyance to and from hospital	957	2	4
Building repairs, and furniture and property ...	291	16	7
Other expenses, including salaries, printing, rates, taxes, insurance, and miscellaneous ...	1,305	14	6
	<u>£2,554</u>	<u>13</u>	<u>5</u>

The weekly cost per head was :

	£	s.	d.
In-maintenance	0	17	0½
Building repairs, furniture, &c.	0	5	3
Other charges	1	3	2½
	<u>£2</u>	<u>5</u>	<u>6</u>

The following is the number of days of patients' maintenance for the year :—

West Derby	3,573 days
Liverpool	2,824 "
Toxteth Park	1,496 "
Total	<u>7,893 "</u>

The average daily number in the hospital for the year was 21.

The foregoing expenditure is exclusive of repayment of loan and interest, which is not in the accounts of the Committee.

This I estimate to be £782 19s. 7d. for the year, and adding the amount to the previous figures, the average cost per week for each patient would be £2 19s. 4d., including everything.

Taking the combined assessable value of the three contributing authorities at £5,292,668, and the gross expenditure as £3,337 13s. 0d., the charge on

the rates and to the ratepayers amounts to less than one-seventh of a penny in the £.

This is a very important factor in viewing the financial aspect of the undertaking.

All patients discharged from the hospital during the year have been traced and visited as far as practicable, and I submit reports as to their present position and surroundings for the information of the Committee.

The Medical Officers have been requested to furnish reports similar to last year.

I cannot add on this occasion to the general observations in my previous report, but I would respectfully request the Committee to consider whether women and children should not now be allowed the advantage of treatment in the Sanatorium, as the men have monopolised its use so far.

In conclusion, I have to say that the highest credit is due to the Matron and staff for their efficient and admirable administration of the Institution.

HARRIS P. CLEAVER,
Clerk to the Committee.

MEDICAL REPORTS.

REPORT ON THE PATIENTS OF THE WEST DERBY UNION FOR 1904.

TO THE CHAIRMAN AND MEMBERS OF THE HESWALL JOINT HOSPITAL COMMITTEE.

GENTLEMEN,

I HAVE pleasure in enclosing my report for the year ending November 30th, 1905, on the patients admitted into the Heswall Sanatorium from the West Derby Union.

There were 10 patients remaining in the Sanatorium at the commencement of the year, of whom all have been discharged.

During the year 19 patients have been admitted and 10 still remain on the Sanatorium, making a total of 29 patients under treatment.

The 10 beds allotted to the West Derby Union have always been full, and I only regret that no more beds were available, as I have had to reluctantly decline admission to several suitable and deserving patients.

I have been particularly pleased with the steady progress towards recovery in a large number of my cases, and the great benefit that all have received during their stay in the Sanatorium. In several instances the disease has been apparently arrested, and the patients enabled to return to their employment as well as ever. In many other cases the patients have been so much benefited as to be able to work with due regard to the observance of open air principles.

The fact that we are able to arrest the deadly disease in several cases each year, and to confer great benefits upon many others, so preventing them drifting into a condition of hopelessness and chargeability to the rates for many years, is to my mind a complete justification for the existence of the Sanatorium; moreover the education and knowledge of how to live is of such immense importance in preventing the spread of the disease at home.

I have been able during the year to keep in touch with many of the patients, and it is gratifying to find many of them continuing at their work in apparently good health.

The conduct and behaviour of the patients has been exemplary, whilst the conduct of the Institution by the Matron, Miss Bateson, and her staff, has been excellent. I hope the good work will be long continued.

NATHAN RAW, M.D., M.R.C.P., (Lond.).

November 30th, 1905.

STATISTICAL TABLES.

Remaining in Sanatorium ...	...	...	...	...	10
Admitted during the year ...	...	...	...	...	19
					<hr/>
Total under treatment ...	...	...	...	...	29
					<hr/>
Remaining at date ...	...	...	...	...	10

RESULTS OF TREATMENT.

Disease arrested ...	...	...	...	...	...	7
Much improved ...	...	...	...	...	...	17
Improved ...	...	...	...	...	...	3
Not improved ...	...	...	...	...	...	2
						<hr/>
Total ...	...	...	...	...	...	29
						<hr/>

REPORT ON THE TOXTETH PATIENTS.

TO THE MEMBERS OF THE JOINT COMMITTEE.

LADIES AND GENTLEMEN,

I BEG to submit the following report on the Toxteth patients who have been inmates of your institution for the year 1905.

These were ten in number; four were in residence at the commencement of the year, and six were admitted during the later months.

Notes of Cases.

- (1) F. W., aged 19—Admitted June 3rd, 1904; discharged January 27th, 1905.

Weight on admission—8 st. 2½ lbs.; weight on discharge—8 st. 11½ lbs. T.B. absent. Disease completely arrested.

This man presented himself at the Workhouse for examination two months ago. He is working and in good health, but losing in weight.

- (2) R. F., aged 24—Admitted August 17th, 1904; discharged April 15th, 1905.

Weight on admission—9 st. 4½ lbs.; weight on discharge—11 st. 3½ lbs. T.B. present, scanty.

At present an inmate of Toxteth Workhouse Hospital; was admitted some months ago suffering from "spitting blood." There are a few physical signs pointing to phthisis—no spitting; weight 10 st. 1 lb.

- (3) G. C., aged 20—Admitted October 17th, 1904; discharged May 20th, 1905.

Weight on admission—6 st. 7 lbs.; weight on discharge—7 st. 3 lbs. T.B. present.

This patient's physical condition was much improved; lung condition unchanged.

- (4) J. A., aged 24—Admitted October 28th, 1904; discharged April 14th, 1905.

Weight on admission—7 st. 11 lbs.; weight on discharge—8 st. 6½ lbs. No T.B. Disease completely arrested.

- (5) J. H., aged 20—Admitted January 27th, 1905; discharged April 14th, 1905.

Weight on admission—9 st. 2½ lbs.; weight on discharge—10 st. 10 lbs. No T.B.

This was a very early case of phthisis. Disease completely arrested.

The remaining patients are still at Heswall :—

- (6) M. McG., aged 23—Admitted May 6th, 1905.

Weight on admission—7 st. 9 lbs.; weight (end of November)—7 st. 10 lbs. T.B. still present.

This man is not a satisfactory case.

- (7) J. B., aged 10—Admitted May 6th, 1905.

Weight on admission—3 st. 12 lbs.; weight (end of November)—3 st. 12 lbs. No T.B.

This lad's lung condition has much improved.

- (8) G. D., aged 12—Admitted May 6th, 1905.

Weight on admission—4 st. 12 lbs.; weight (end of November)—5 st. 7 lbs. No T.B.

Not a very hopeful case.

- (9) A. B., aged 32—Admitted May 6th, 1905.

Weight on admission—9 st. 9 lbs.; weight (end of November)—10 st. 5 lbs. No T.B.

This man is practically well. If he could obtain outdoor country work and keep in condition his recovery would be complete.

- (10) W. M., aged 22—Admitted May 27th, 1905.

Weight on admission—8 st. 7 lbs.; weight (end of November)—9 st. 7 lbs. T.B. present in small quantity.

This man, a clerk, was admitted to Heswall without passing through to the Workhouse Hospital. During the months of June and July he got steadily worse, and apparently was going to break down completely. In August and September he improved and is now doing exceedingly well. He has benefited so much by Sanatorium treatment that there is a reasonable hope of continued improvement, and it may be ultimate recovery.

In conclusion, I beg to acknowledge the excellent services of Miss Bateson and the nursing staff during the past twelve months.

DAVID SMART, B.Sc., M.B.

LIVERPOOL CASES, 1904-5.

LADIES AND GENTLEMEN,

I HAVE the honour to submit the Third Annual Report of the Liverpool patients for the year, 1st December, 1904—30th November 1905 :—

In hospital, 1st December, 1904	8
Admitted during the year	26

Total	34
--------------	----

Discharged	25
In hospital, 30th November, 1905... ..	9

Total	34
--------------	----

Results as judged at the time of Discharge.

Cured	1
Much improved	4
Improved	13
Slightly improved	3
Not improved	4

Total	25
--------------	----

Results as judged now—1st December, 1905.

Disease apparently arrested	3
Fit for work, more or less	12
Not fit for work	5
Dead	2
Recently discharged, or not heard of	3

Total	25
--------------	----

The general work and discipline have been carried out by Miss Bates and her staff as efficiently as in past years.

I am, Ladies and Gentlemen,

Yours faithfully,

J. ERNEST NEVINS

EMBER 1ST,

Discharge.

well, was
enlast wrote:
seen by Dr.

ownlow Hill
in May.

burne (reason
e); went to

ownlow Hill
with hammor-
time during

but could not

times and seen
very well;
neck, which
he healed.

in August
ill.

in end of Sep-
ber and look-
ing heard he
was in Brown-
firmly.

him; said he

EMBER 1ST, 1904, AND NOVEMBER 30TH, 1905.

e Discharge.	Visiting Officer's Report.
well, was then last wrote; seen by Dr.	Has casual employment as dock labourer; not been in hospital or had medical treatment since leaving Heswall nearly 12 months ago. Says much improved, cough trifle troublesome at times; follows out treatment: stays at lodging house.
ownlow Hill in May.	Admitted to Brownlow Hill five months after leaving Heswall: has been in and out repeatedly; left about 7th September, fairly well and able to work.
..	Has been in and out of Brownlow Hill Hospital since leaving Heswall. He is only able to do very light work.
nurse (reason e); went to	Unable to trace.
ownlow Hill with hæmorrhage time during	From information obtained, this man after leaving Heswall worked at the docks as a labourer; also went a voyage as a steward. He was in Brownlow Hill Hospital during the summer; he was again admitted last month, and is still a patient there.
but could not	Feeling much better; has had neither medical treatment nor been in hospital since leaving; working as a dock labourer. Only casual employment. Slight cough. Lives in model lodging house.
times and seen very well; neck, which ite healed.	Has been working pretty regular as a tailor's presser since leaving hospital, but his employer and landlord had to give him notice to leave on account of his unsteady habits recently; greatly improved in health; coughs very little.
J. in August 11.	Feels quite well. He has worked as a freight clerk since leaving Heswall. Follows treatment.
n end of Sep- -ik and look- ve heard he n in Brown- -firmary.	Has been in and out of Brownlow Hill Hospital since July, and is going in again this month. From the time he left Heswall until July he did very little work. Has a very bad cough.
..	Physically fit for work, but unable to get employment owing to deafness; health improved; never complains of any ailment; very seldom coughs; not had medical advice since leaving; follows out treatment. Lived in same court for seven years.
im; said he	Died in Brownlow Hill Infirmary, 17th September, 1905.
..	Two months after leaving Heswall he caught a fresh cold; he then went into Brownlow Hill Hospital for eight days. Since then he has worked continually as a dock labourer. Still has a slight cough.

1904, AND 1

THE NEW YORK
PUBLIC LIBRARY

ASTOR
T. T. A.

ra	
ow	Transfer there (work; health)
	Working better and m
ta	Was em and li Son as troubl
ery hen he this	Not be no co of fre
ns- Hill	Not a Hee
	When wo
al- on; not	Feeli &c. got tre
to- and	Feel lol
	Fro H on
	Aft a b
	He
	Di

1904, AND NOVEMBER 30TH, 1905—continued.

No.	Visiting Officer's Report.
Now	Transferred to Brownlow Hill Hospital from Heswall; remained there for two months, until 10th July; improved and fit for light work; has been in and out since, and is now in there in failing health.
	Working constantly as a labourer in a paint works. Seems great deal better; looks well; has slight cough at night; takes cod liver oil and malt, and follows treatment. Surroundings fair.
At a	Was employed in Birkenhead at a hairdresser's shop for two months, and lived in, but now got constant work as a labourer at Phillip, Son and Nephew's. Says feels all right and much improved; cough troublesome at times. Surroundings only moderate.
Every when he his	Not been able to find employment since leaving. Greatly improved; no cough whatever; not had medical treatment since; gets plenty of fresh air.
Hes- wall.	Not any improvement; went direct to Brownlow Hill Hospital from Heswall, and is still a patient there.
	When seen September last this man was looking well and fit for work.
Failing on; not	Feeling better, but unable to follow his employment as paperhanger, &c.; been staying at a farm house at West Derby for several weeks, going away again; bad cough; takes cod liver oil and malt; follows treatment.
Sto- and	Feels much better; only has a slight cough; is able to do light work follows treatment.
	From information obtained this man has been in Brownlow Hill Hospital twice since his discharge from Heswall. When last seen on the 26th November, 1905, was fit for work.
	After working at the docks for two days he was unable to continue, and has not worked since, having gradually become weaker; he has a very bad cough.
	He came out of hospital on the 15th November, 1905, and died on the 24th November, 1905.
	Discharged from Heswall, 16th November, 1905; admitted to Brownlow Hill, 20th November, and still in; does not seem any better.

DECEMBER 1ST, 1

once discharge.	
Mill Road In- for the second discharge.	W
.. ..	H
.. ..	W
ember was in a dition at Mill mary.	Al
.. ..	He
ornow Hill In- short time for ; lungs all heard since he in Mill Road	W
he 10th; fairly not able to life has good monthly nurse.	Oc
May 28th, is lost 8 lbs., but Cold Storage is y.	H
to Mill Road on account of erature; after- nt to sea, but turn home.	W
times—last on th; is working (car con- ed is very well.	Oc
.. ..	Th
.. ..	Be
he was seen s ago, looking is not working.	He
.. ..	Nc
parents; was working.	Hi
.. ..	Si
ne is well, and	He
Canada, and he is well.	Oc
.. ..	Hi

THE NEW YORK
PUBLIC LIBRARY
ASTOR
TILDEN

DECEMBER 1ST, 1904, AND NOVEMBER 30TH, 1905.

Discharge.	Visiting Officer's Report.
Mill Road In- or the second discharge.	Was in Mill Road Hospital for six months after leaving Heswall, then went out for two months; not worked; could have done light employment, unable to get it; readmitted to Mill Road in September and is still in, feeling much better now; cough troublesome at times.
.. ..	He has been working at the Docks since leaving hospital; his health is much improved; still has a slight cough.
.. ..	Working occasionally as a cotton porter; not much improvement; cough very bad, spitting of blood at times; living alone, no person to look after him; wife and family left him, therefore house naturally neglected.
ember was in a dition at Mill mary.	After being out of hospital one week he went into Mill Road Hospital and was there two months, after coming out he gradually became weaker and went into Mill Road Hospital again; where he died on the 10th September, 1905.
.. ..	He was idle about two months owing to an attack of pleurisy, since then he has worked as a fruit porter; he is now living in Knotty Ash, and is feeling much better; he still has a slight cough. Surroundings clean. Follows treatment.
rnlow Hill In- ort time for ; lungs all ard since he in Mill Road	Worked as a jobber, unable to get much work. Was admitted to Mill Road Hospital in August suffering from "Gastric Catarrh," and is still there; has very severe cough.
10th; fairly not able to fe has good onthly nurse.	Occupation: Working four months as freight clerk at White Star Co. shed, Canada Dock; has improved considerably; feels better now than he has done for the last six years. Follows treatment. Surroundings clean.
May 28th, is lost 11lbs., but old Storage is	He was two weeks idle after leaving hospital; he then went to work at the Sainsbury Refrigerating Co., and has been employed there off and on ever since. Health is much improved; still has a slight cough. Follows treatment.
Mill Road on account of nature; after- t to sea, but rn home.	Went to sea as a fireman on board s.s. "Lake Champlain"; was taken to hospital at Montreal, remaining there three months; returned to Liverpool by the s.s. "Milwaukee"; sent to Mill Road 1st September, 1905, and died there 13th September, 1905. "Phthisis."
times—last on h; is working (car con- is very well.	Occupation since leaving Heswall being tram conductor; great improvement; never felt better; appearance healthy in every respect; no cough; rigidly follows treatment. Surroundings very good. Lost 11lbs. weight out of 26lbs. gained in hospital.
.. ..	This boy (age 8 years) has enjoyed the best of health since leaving Heswall.
.. ..	Been an out-patient of Stanley Hospital since; no improvement; cough very bad; follows treatment as far as possible; attends school occasionally.
he was seen ago, looking not working.	He has been unable to do any work since leaving Heswall; is thinking of going back into Mill Road Hospital.
.. ..	Not been able to follow his employment as a printer owing to slackness in trade; complains of pains in his side for last two weeks; cough very bad at night; follows treatment; lost weight. Surroundings healthy.
arents; was rking.	Has worked as a farm labourer since leaving Heswall; his health is much improved.
.. ..	Since coming out of hospital he has enjoyed very good health; he is a hawker of flowers.
is well, and	Health is much better; was three weeks idle; he then went to work at Farrie's Sugar Works and has been employed there ever since. Follows treatment.
Canada, and is well.	Occupation: Goes to sea as a coal trimmer; has made one trip: great improvement.
.. ..	Has worked as a window cleaner since leaving hospital, and has not been idle one day. Surroundings clean. Follows treatment.

THE NEW YORK
PUBLIC LIBRARY

ASTOR LENOX
TILDEN FOUNDATION

REPORT ON TOXTEETH PATIENTS DISCHARGED FROM HESWALL BETWEEN DECEMBER 1ST, 1904, AND NOVEMBER 30TH, 1905.

No.	Name.	Admitted.	Discharged.	Gained.	Sputum Report.	Result.	History since discharge.	Visiting Officer's Report.
1	F. W.	June 3, 1904.	January 27, 1905.	9½ba.	January 21—T.B. absent.	Disease completely arrested. Dr. S.	Seen by Dr. Smart, and says perfectly well ; was over here during summer.	Did no work until the end of May ; since then he has worked every day as a labourer. Has a slight cough ; follows treatment.
2	J. A.	October 28, 1904.	April 14, 1905.	9½ba.	T.B. absent.	Cured. Dr. N.	Was seen a short time ago, and was work- ing, though did not look very well.	Feels quite well. He commenced work as a bruan maker im- mediately he came out of hospital, and has not been idle since ; follows treatment.
3	J. H.	January 27, 1905.	April 14, 1905.	1st. 7½ba.	.. .. ..	Cured. Dr. S.	.. .. ..	Was idle for two months ; he then went on a trip as a steward to the West Coast of Africa—whilst there he had an attack of malarial fever ; he is now feeling quite well ; follows treatment. Surroundings clean.
4	C. F.	August 17, 1904.	April 15, 1905.	1st. 13½b.	April 13—Scanty T.B.	Much improved. Dr. S.	In Toxteth Infirmary for treatment of eyes, chest in good condition.	Two months after leaving Heswall he gradually became weaker, and on the 14th September, 1905, admitted into Toxteth Workhouse Hospital, and is still a patient there.
5	G. G.	October 17, 1904.	May 20, 1905.	7½ba.	.. .. ..	Much improved. Dr. N.	Came over September 1st, looks very thin ; says fairly well, but work is very heavy.	Up to three months ago he was feeling fairly well, but since then he has gradually become weaker ; is only able to do light work. Follows treatment.

PATIENTS IN THE SANATORIUM ON DECEMBER 1ST, 1905.

No.	Name.	Union.	Date of Admission.	Weight on Admission.	Present Weight.
			1905.	st. lbs.	st. lbs.
1	D. E. ...	West Derby	April 15	10 0	10 8
2	J. W. C.	"	June 17	8 10	10 7
3	J. H. ...	"	July 5	8 11½	9 5½
4	A. O'M.	"	" 8	9 12½	10 5½
5	B. M. ...	"	September 9	9 8	10 2
6	W. J. ...	"	" 9	7 10	8 10½
7	L. C. ...	"	" 23	7 3	7 10
8	H. C. ...	"	" 30	9 12	11 0
9	G. P. ...	"	" 30	8 10	8 11½
10	W. A. ...	"	" 30	10 3	11 1
11	J. R. ...	Toxteth ...	May 6	3 8	3 12 (Child).
12	M. McG.	" ...	" 6	7 9	7 12
13	A. B. ...	" ...	" 6	9 9	10 6
14	G. D. ...	" ...	" 6	4 12	5 6½ (Child).
15	W. M. ...	" ...	" 27	8 7	9 9
16	W. C. ...	Liverpool...	" 29	9 0	9 0
17	M. H. ...	" ...	August 14	8 11	8 9½
18	P. McG.	" ...	September 29	8 3½	8 7
19	J. D. ...	" ...	" 29	9 0	9 12
20	W. P. ...	" ...	October 18	8 8	8 11
21	J. H. ...	" ...	November 16	8 2	8 9
22	T. G. ...	" ...	" 16	8 7	9 0
			(re-admission)		
23	P. R. ...	" ...	November 16	8 7	8 12½
24	T. F. ...	" ...	" 27	9 3	9 3

24 Patients in hospital on December 1st.

23 Patients in hospital now.

FOURTH ANNUAL REPORT.

For Year ended 30th November, 1906.

REPORT BY THE CLERK.

Since last report 60 cases have been admitted, 59 discharged. Remaining at end of the year 24.

I submit a Statement of Accounts for the year ending Michaelmas, 1906, as follows:—

Receipts.

	£	s.	d.
From West Derby Union	1,247	0	0
" Pariah of Liverpool... ..	1,123	0	0
" Township of Toxteth Park	596	0	0
Miscellaneous Receipts	4	14	4
	£2,970	14	4

Expenditure.

	£	s.	d.
In-Maintenance, including Provisions, Necessaries, Clothing, Drugs and Conveyance to and from Hospital	949	15	9
Building Repairs and Furniture and Property ...	523	4	11
Other Expenses, including Salaries, Printing, Rates, Taxes, Insurance and Miscellaneous ...	1,269	12	0
	<u>£2,742</u>	<u>12</u>	<u>8</u>

The weekly cost per head was :—

	£	s.	d.
In-Maintenance	0	16	8½
Building Repairs, Furniture, &c.	0	9	2½
Other Charges	1	2	4½
	<u>£2</u>	<u>8</u>	<u>3½</u>

The following is the number of days of patients' maintenance for the year :—

West Derby	3,474 days.
Liverpool	2,908 "
Toxteth Park... ..	1,567 "
	<u>7,949</u>

The average number daily in the Hospital for the year was 22.

Since last year's Report a new arrangement has been made by the appointment of Dr. J. B. Yeoman, as Medical Superintendent, whose report is appended hereto, and will no doubt be read with much interest.

A pleasing feature in the history of the Hospital is the receipt of letters from former patients who have been restored to health, expressing gratitude for their treatment in the Hospital.

The Matron continues the management of the Hospital with the greatest success and credit, and her devotion to the welfare and comfort of her patients is worthy of all praise.

All patients discharged from the Hospital during the year have been traced and visited as far as practicable. I submit reports as to their present position and surroundings for the information of the Committee.

I strongly urge the advisability of providing for the accommodation of more patients. The increase in Establishment Expenses would be small, and a great reduction in the average cost would result.

HARRIS P. OLEAVER,

Clerk to the Committee.

Brongham Terrace,
Liverpool,
12th December, 1906.

REPORT BY THE MEDICAL SUPERINTENDENT.

TO THE CHAIRMAN AND MEMBERS OF THE COMMITTEE.

LADIES AND GENTLEMEN,

THE following Report which I have the honour to submit to you contains a record of the work of the Sanatorium during the last twelve months, but the change in the administration of the Hospital, which resulted in my appointment, dates from the 18th of February, 1906.

In accordance with my agreement with you I have attended daily at the Sanatorium, and at other times when called upon to do so.

As the present scheme is more or less an experimental one, I may be allowed to briefly sketch the routine which seemed to offer the best chance of success.

As soon as a patient was admitted to hospital a detailed note of his case was taken. This note included not only the result of the examination of his chest, but also certain data in relation to his social habits, earning power, and general surroundings under ordinary circumstances. Each patient remained in bed for one week subsequent to admission, so that his weight, appetite, cough, progress, and character could be gleaned by observations of the nursing staff. During this probationary period instructions were given with regard to practical questions, such as the application of the handkerchief to the mouth in paroxysms of coughing, the careful disposal of expectoration, etc., and the patient was stimulated into taking an active interest in the attempt which was being made to combat his disease. At the end of the first week, if the patient showed no adverse signs, he was allowed to take up a position among the other inhabitants of the Sanatorium.

The medical inspection took place, as far as was practicable, in the morning, and any patient who showed signs of fever, or other accompaniments of the disease, was sent back to bed. Temperature observations were made three times a day, and weights were noted once in the week. Each patient was subjected to a thorough physical overhauling at least once a week, and the results of the examination were written upon his case-taking paper, so that a continuous record of his progress was obtained.

From time to time visits were paid to the dining-hall, and the character of the provisions served, the state of the cooking, and the appetites of the patients were passed under review. Through the nursing staff I was constantly in contact with this question of appetite, which is rightly regarded as one of the most important factors in sanatorium treatment.

Patients in whom it was obvious that improvement was steadily taking place were told off to take part in small domestic duties, and when evidence was forthcoming that the improvement was maintained they were introduced to harder tasks, such as gardening, and if found to work satisfactorily, and that other things were equal, they were considered fit for discharge.

Laboratory Work.

This consisted in systematic searchings of the expectoration for the presence of the tubercle bacillus. In accordance with the opinion of experts I did not consider it necessary to detain a patient in the Sanatorium who had no signs of any active disease, and who had merely a few scattered bacilli, found with difficulty under the microscope, in an expectoration which it was almost impossible to obtain. The result of 89 investigations were recorded in the laboratory register, whilst some 200 specimens of expectoration were examined. The following patients had no expectoration at any time during their stay in the Sanatorium, viz. :—

H. C. (W.D.)	C. M. (W.D.)	J. D. (T.)
T. L. (W.D.)	C. F. (W.D.)	A. B. (T.)
J. S. (W.D.)	J. R. (T.)	

In none of the above-named was there any doubt but that they were suffering from tuberculosis, and from some of them tubercle bacilli had been obtained prior to their reception at Heswall.

Collection and Destruction of Sputum.

Each patient was supplied with paper handkerchiefs and pocket flask. The handkerchiefs and contents of the flasks were collected twice daily, and destroyed by burning at a special place in the grounds.

Accommodation in the Sanatorium,

Twenty-four beds are the present complement, and all are reserved for male patients. The staff of nurses and the domestic staff, with a very small increase, could be utilised for a much larger number of beds. So firmly convinced am I of this fact that I would urge the Committee to enquire into the advisability of increasing the bed accommodation so as to lessen the relative cost per head of the inmates. In the year 1905 Liverpool had 1,245 deaths from phthisis, and in the ten years from 1895-1904 a total number of 12,721 deaths from this disease were recorded. Dr. Philip, Senior Physician Royal Victoria Hospital, Edinburgh, an institution for the treatment of consumption, makes the statement that "the ascertained mortality from consumption in any city might be safely multiplied by ten in order to represent approximately the number of persons living, already seriously affected." He goes on to say "that fuller investigation into the subject has convinced him that this figure is, as he indeed hinted it probably was, much within the mark. He is satisfied that twice the figure is still below the mark." If this view be correct, and it is made upon the authority of one of the earliest and most accurate observers in this field of activity, it means that there are at the present moment in Liverpool 24,900 persons "already seriously affected." Dr. Philip points out that his figures refer to tuberculous disease of the lungs only, and do not include other forms of tuberculous affection. The Liverpool Sanitary Authority has a system of Voluntary Notification of Phthisis which has been in use since February, 1901, and is described by Dr. Hope as being continued with good results. Under this scheme 1,861 new cases of phthisis were notified in 1905, and of these 1,257 were males and 604 females. The existence of this large number of affected individuals should be a plea for the extension of facilities for combating the trouble.

Ventilation, warmth, and other general arrangements have been quite adequate throughout the year.

Diet.

The dietaries in use are those which were prescribed prior to my appointment, and they have been used during the past twelve months, with the exception of short intervals, when change was necessitated through peculiar climatic conditions, e.g., very hot weather, when the amount of milk was increased, and the quantity of meat relatively decreased. The condition of individual patients occasionally required special diet, e.g., all milk diet.

Fresh air and regulated diet constitute two of the most important factors in the treatment of phthisis. The Heswall dietaries have called for much care and attention on my part as Medical Officer, and an enquiry into the cost of food in other Sanatoria led me to the following conclusions:—

- (1) At Heswall we have to deal with men of the labouring class, who are accustomed at times of full work to large quantities of bulky food.
- (2) Some persons are admitted who have, owing to ill health, been deprived of suitable food over a longer or shorter period.
- (3) Many have been accustomed to the excessive use of alcohol.
- (4) All eat very large amounts when first admitted to the Sanatorium. Making allowance for these conditions, and also for the circumstance that no patient has ever been restricted as to the quantity of any article in his dietary, I am of opinion that the cost of our diet is still in excess of the cost in other working class sanatoria.

It is my intention, if the Committee approve of my action, to introduce the system which I saw in force at the King Edward VII. Sanatorium at Midhurst. This consists in weighing the prescribed diet to each individual patient, and again weighing any portion left over; by this means there is an accurate gauge of the patient's appetite, and precise data are obtained

for judging his state, as well as minimising the tendency to waste. The Superintendent of the King's Sanatorium also pointed out that a saving might be procured without in any way affecting the efficiency of the diet, for its special purpose, by contracting for best foreign meat instead of British.

Expenditure on Clothing.

In comparing the cost of maintenance at Heswall with that of other sanatoria, it should be borne in mind that a minimum of fifteen shillings per head is spent on underclothing for each patient at the time of discharge. No other sanatorium does this, and it might be better to supply underclothing to those cases only in whom there is abject poverty and inability to obtain the necessary garments. The principle of supplying these articles of clothing is a good one, but a number of patients who claimed them were not in actual need, and it might be left to the staff here to determine to whom they should be distributed.

Drainage.

The internal fittings of the Sanatorium were inspected at intervals and everything was found in order at each inspection.

Sewage disposal, which always proves a difficulty in isolated buildings planned for the residence of a large number of individuals, is obtained by one of the methods of Bacterial Sewage Purification, known as the Fiddian Continuous Filter. The County Medical Officer of Health for Cheshire reports that he visited the Sanatorium for the purpose of inspecting the Works for the purification of the sewage of the Institution. "He found that the sewage was passed through a well-constructed tank, and that the effluent therefrom was delivered on a graded filter or broken clinker, circular in plan. The delivery was effected by means of a Fiddian Distributor, which works automatically. All the arrangements appeared to be in good order. The apparatus was working quite smoothly, and there was no effluvia therefrom. A sample of the effluent as discharged into the estuary of the river was analysed. It was found that there was

1·97 grains per gallon of Nitrogen in Nitrates,
0·48 grains per gallon of Free Ammonia,
8·24 grains per gallon of Albuminoid Ammonia.

The effluent therefore classes as a fairly good one.

Recently there has been some trouble with the excess of storm water, but the defect is being remedied by the supply of an overflow.

Statistical Return.

At the present date there are 24 patients undergoing treatment, and the same number were in the Sanatorium at the corresponding date in 1905. During the twelve months under review 58 patients were treated.

Range of Age.—This varied from 11 years to 52 years.

Average Age.—Nearly 29 years.

Although many of the men at the more advanced ages are noticed to have improved, it seems to me that a rule not to admit patients over 45 years of age to the institution would prove advantageous, for the majority of these older patients are individuals with a chronic type of phthisis, in whom the prospect of a permanent arrest is very remote. When the type of the disease conforms to this description a rest for a month or two in any ordinary infirmary would, as a rule, restore health in much the same measure as the sanatorium treatment.

Occupations.—Children, 6, labourers 29, porters 3, car conductors 2, joiners 2, shoemakers 2, painters 2, clerks 2, hawker 1, smith 1, plumber 1, van driver 1, cabinetmaker 1, fireman 1, seaman 1, vergier 1, steward 1, waiter 1.

Five of the 58 persons treated were wholly illiterate, being neither able to read or write.

Average Wage.—Seventeen patients who consecutively entered the Sanatorium earned on an average £1 per week, while the average expenditure was as follows :—

					£	s.	d.
Tobacco	...	...	...	...	0	0	10
Beer	...	...	...	...	0	1	0
Food and lodging	...	...	...	...	0	10	0
Sick club	...	...	...	...	0	0	3

Out of these seventeen, seven were total abstainers, and one individual spent five shillings per week on alcoholic drinks.

Classification of Results.

In order that there may be a definite standard for the comparison of our results with those of other sanatoria, I have adopted the headings suggested by Dr. Burton Fanning.

I.—Recovery with fitness to Work.—By this is meant that he is fit for any work or condition of life not admittedly injurious to health. Among a number of guides for allocating patients to, or excluding them from, this class, Fanning writes, "there may also be a little expectoration, containing perhaps tubercle bacilli, and yet the individual may live his full term of years without curtailment of his activity or usefulness."

Toxteth.—A. Brady, G. Rafferty, W. Morris, J. Rafferty, J. Martin, J. Morrison, J. Dodd, C. Maston, and G. Oribbin.

Liverpool.—J. Diore, P. McGann, J. Hamill, P. Rainford, P. Cassidy, J. O'Brien, and J. Johnson.

West Derby.—D. Evans, W. E. Adams, W. Johnstone, H. Crawford, C. Mills, J. Costello, T. Lyons, Jun., W. Dwan, F. Dutton, P. Sharkey, J. W. Clarke, A. O'Malley, T. Lyons, R. Martin, F. Hanagan, J. Smith, T. Green, S. Westhorpe, C. Feeney, and B. Cunningham.

II.—Arrest of Diseases with fitness for a certain degree of Work.—Cases precluded from the adoption of anything like a strenuous life, their work must be specially selected for them to suit their special requirements.

Toxteth.—G. Doane and J. Peers.

Liverpool.—M. Healey, W. Peers, J. Heeney, W. Devine, and P. Larkin.

West Derby.—J. Haw, L. Cummings, and F. Rowe.

III.—Improved.—Constitutional symptoms ameliorated, but probably no dependence can be placed on the improvement being maintained.

Liverpool.—F. Whelan.

West Derby.—W. Mann and S. Harrison.

IV.—No improvement.—In this class the patients are placed who make no lasting response to treatment, or who retrogress in spite of our efforts.

Toxteth.—M. McGough, J. Evans, and T. Gutheridge.

Liverpool.—W. G. Corkhill, T. Fox, J. Cullen, T. Grady, and W. Wilson.

West Derby.—G. Price.

Medicinal Treatment.

Reliance has been placed on fresh air, diet, rest, good hygienic conditions, rather than upon drugs. An examination of the list of drugs used will show that only simple remedies have been required. The progress in treatment of tuberculosis by the employment of serums and vaccines has been carefully

followed, but the results, coupled with the small amount of definite information procurable, have seemed to me insufficient to justify the introduction of experimental work into your hospital. In this connection the following quotations from Allbutt's System of Medicine, published a month, may be noted :—

"Good results are claimed for Maragliano's Serum in Italy, but it has gained acceptance elsewhere."

"The value of Marmorek's Serum is still doubtful."

"With regard to tuberculosis, Von Behring in 1905 announced a product of the tubercle bacillus which might be used for vaccination. As this can be made out this essentially consists of bacilli from which all toxic materials have been extracted, but up to the present details wanting."

Conclusion.—I have to thank the nursing staff for enthusiastic co-operation in every detail of this work. To Miss Bateson I must tender thanks for excellent supervision of everything in connection with the Sanatorium. I am also indebted to my colleague, Dr. H. G. Carlisle, for much valuable assistance.

I am,

Yours faithfully,

JOHN B. YEOMAN,
M.D., F.R.C.S., (Edin.), D.P.

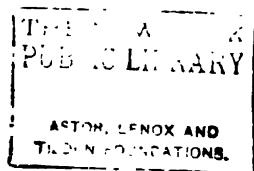
1st December, 1906.

PATIENTS IN HOSPITAL ON DECEMBER 1ST, 1906.

No.	Union.	Name.	Admission	Gained.	Sputum.
1906.					
1	W.D.	O. B.	June 1	9 lbs.	T.B. very few.
2	"	R. M.	July 30	8½ lbs.	No T.B.
3	"	C. F.	September 5	1 st.	No sputum.
4	"	D. S.	" 5	5½ lbs.	T.B.
5	"	M. S.	October 12	11 lbs.	No T.B.
6	"	E. W.	November 3	9 lbs.	T.B.
7	"	J. M.	" 3	3 lbs.	T.B. loaded.
8	"	H. C.	December 1	—	T.B. (?).
9	"	H. B.	" 1	—	T.B.
10	"	J. D.	" 1	—	T.B.
11	L.	P. C.	August 28	11 lbs.	T.B. few.
12	"	J. D.	" 28	1 st. 3 lbs.	T.B.
13	"	W. S.	July 19	1 st. 1 lb.	T.B. few.
14	"	L. P.	September 11	10½ lbs.	No T.B.
15	"	E. C.	May 31	7½ lbs.	T.B.
16	"	J. S.	July 9	1 st. 7½ lbs.	T.B. loaded.
17	"	P. G.	" 9	1 st.	T.B.
18	"	J. D.	September 11	10 lbs.	T.B. few.
19	"	B. B.	March 13	Lost 4½ lbs.	T.B. very few.
20	T.	J. M.	October 31	Gained 6½ lbs.	T.B.
21	"	G. P.	November 9	6 lbs.	T.B.
22	"	A. M.	September 28	12 lbs.	T.B.
23	"	W. D.	" 28	8 lbs.	A re-admission. T.B.
24	"	A. C.	" 18	10 lbs.	T.B. loaded.

NG ON, AND INCLUSIVE OF, DECEMBER 1ST, 1906.

Charge.	Visiting Officers' Report.
clothes.	Was sent to goal for stealing clothing from Sanatorium and was convicted at Chester on the 1st January, 1906, and sentenced to six months' hard labour. Unable to trace.
..	Unable to trace.
Drinking tion.	Unable to trace.
abordin-	He came straight from Heswall to Brownlow Hill Hospital and remained there four weeks; he then got employment as a rope sorter in a marine store, and worked every day until the beginning of July, when he began to gradually fail in health. Towards the end of July he again went into Brownlow Hill Hospital, and is still a patient there.
..	He was able to work as a casual dock labourer until the month of June; he then went into Brownlow Hill Hospital, having caught cold. He stopped in Hospital for seven days and has since been working at the docks as a casual labourer. Has a slight cough; follows treatment.
Brown- ry.	He was unable to do any work when leaving Heswall, and after being idle for three weeks was compelled to go into Brownlow Hill Hospital. He has been in and out ever since, and is now a patient there.
..	Upon his discharge from Heswall he commenced to work as a joiner. He is unable to do more than two or three days' work per week. His health has failed very much since leaving Heswall. Follows treatment.
Brown- ry.	On his discharge from Heswall he commenced to work as a cattle drover, but was only able to continue for five weeks. He then went into Brownlow Hill Hospital for two weeks, and upon his discharge from there he again commenced work as a cattle drover, and continued to do so until four weeks ago, when he caught a fresh cold, and had to go into Brownlow Hill Hospital, and is still a patient there.
..	Upon his discharge from Heswall he got employment at the Bevington House Hotel as a porter, and was there until three weeks ago, when he caught cold and had to go into Brownlow Hill Hospital, and he is still a patient there. He has a very bad cough; unable to do hard work.
is dead.	He was never able to work after leaving Heswall, and gradually growing worse, he died on the 13th November, 1906.
..	Says he was in a very bad state when he went to Heswall; a week after leaving there was admitted to Walton Hospital early in June, and been there ever since. Breathing bad, also cough; takes cod liver oil, &c.
..	Commenced to work as a porter on the Liverpool Landing Stage three days after leaving Heswall, and has had two or three days' work per week ever since. Could not do more if he got the work. Has a very bad cough and is gradually becoming weaker. Follows treatment.
..	Died in Sanatorium, Heswall, on the 10th June, 1906.
rk and out.	Idle for four weeks after leaving Heswall, and has since only been able to do about one or two days' work per week at the docks. Unable to do hard work. Has a slight cough.
well.	Only able to get casual employment as a dock labourer; any heavy work brings back pains, although says he feels much better. Weight not altered; cough trifling troublesome; has windows open; surroundings only moderate.
..	This man is a hawker, and has not been able to work for more than three days a week since his discharge. He gradually grew worse, and on the 16th October, 1906, went into Brownlow Hill Hospital, and is still a patient there.
..	Healthy appearance; fit for work; unable to find employment as ordinary seaman; not been under medical treatment. Cough slightly troublesome at night; lost 4 lbs. weight out of 21 lbs. gained; surroundings fairly good.
4; is and	Unable to trace.



ING ON, AN	
charge.	
s, last on ry well; work.	We p b s s
.. ..	Un
; was sing.	We e v c l
not at	In f s o t
d in Mill early in	We l c
last on well and ote on	Ce
h, well, Hoylake;	U
er; well.	A
.. ..	L
er; well og.	
.. ..	
.. ..	
.. ..	

ING ON, AND INCLUSIVE OF, DECEMBER 1ST, 1906.

charge.	Visiting Officer's Report.
last on ry well; work.	Was a fortnight idle after leaving Heswall, then started as goods porter at L. & Y. Railway Co., Great Howard Street depôt, and been pretty constant since. Gets plenty of fresh air; has just a slight cough; takes cod liver oil regularly; resides in a cellar; sleeping accommodation might be better, although place is clean.
.. ..	Unable to trace.
; was king.	Was idle for a month after coming out of Heswall. He then got employment as a lamp trimmer (L. & N.W. Railway Co.), and worked every day till the middle of September; he then caught cold and gradually grew worse, and died on the 10th October, 1906.
s not at	In very delicate state of health, looks bad; not been able to work for a considerable time; troubled with bronchitis, and cough still very bad; takes malt; gets plenty fresh air. No signs of hæmorrhage since leaving Heswall; greatly benefitted whilst there.
J in Mill early in	Was admitted to Mill Road 19th March, 1906, and remained until 18th May, 1906. Cannot trace what he was doing from May to 20th August, when he was re-admitted to Mill Road Infirmary, and died there 15th September, 1906. Phthisis.
last on well and note on	Commenced working at his trade as cabinet maker in Bold Street three weeks after leaving hospital, and worked ever since—a much longer period at one spell than for five years. Has no cough; eats and sleeps well; thoroughly satisfied with progress made; still has bedroom windows open.
th, well, Hoylake;	Upon his discharge from Heswall he went to reside at Hoylake, and is still living there. He was idle two months after leaving Heswall; then he started business as a painter and decorator (on his own account), and has not been idle since. He feels that his health has improved very much by the treatment he received. Has no cough; follows treatment; also takes emulsion.
or; well.	About the same in health as when he left Heswall; working pretty constant as builder's labourer. Not had medical treatment since; keeps windows open.
.. ..	A marine engineer; not looked for work since. His parents wish him to remain at home this winter; says he feels splendid only for his cough, which is still troublesome. Takes Angier's emulsion; not consulted any doctor since; has bedroom window open night and day, with wire netting placed across; sleeps well; appetite good; respectable neighbourhood.
ner; well ng.	Commenced working as a joiner one week after leaving Heswall for four months without a break; been idle through slackness for five weeks. Has no cough whatever; takes cod liver oil, &c.; not had medical treatment; looks well; appetite good; gained about two stone, lost about one stone; surroundings very good.
.. ..	Looked very well about a month ago, when seen by an acquaintance.
.. ..	Went straight away to sea, and made several voyages as steward on a.s. "Teutonic"; then got a situation in New York as hotel waiter for a time. Now very bad in the Infirmary, Blackwell Island, New York.
.. ..	Had tubercular knee trouble; used to wear irons, but not since leaving hospital; uses embrocation occasionally; has no cough, and is well in health. Attends school regularly. Father died two years ago with consumption.

ND INCL

	Was v rhet agai him up t
ell ch d; ity	Comm Hes in th exce
or as as	Was a and one Abot quan in Ho
ng	Was k unab 30th porte Cong
..	Impro Appa
nd	Starte Sign -stom to se
8;	Canno
ly	Whilst was great does gaine feelin
1;	Does sin. oil: men
..	Impre with as 134
..	Resur hoe
..	Comm stor
..	Worki inte so 1 Cou

AND INCLUSIVE OF, DECEMBER 1ST, 1906—continued.

No.	Visiting Officer's Report.
..	Was working for about one month after leaving hospital, then had rheumatism and was in Mill Road for five weeks; started work again as light porter; gets his food. Cough does not seem to affect him much, seems to improve; healthy locality and open; follows up treatment as far as possible.
ell ch id; ity	Commenced work as a boot and shoe repairer two days after leaving Heswall and has not lost one day's work since. Has a slight cough in the morning; takes emulsion; follows treatment; surroundings exceedingly clean; has gained about 6 lbs. in weight.
for as as	Was admitted to Mill Road Hospital three days after leaving Heswall and remained there for two months; started work as stoker about one week afterwards and has had regular employment since. About three weeks ago, after a fit of coughing, he vomited a quantity of blood, but seems better now. Surroundings fair; only in Heswall six weeks, gained 1½ stone.
ng	Was idle for a short time; could have done light work but was unable to get it. Got fresh cold, and was in Mill Road from 30th August for a month. Now in constant employment as light porter at Cook and Townshend's for two months. Gets his food. Cough bad at times.
..	Improving steadily, benefitted a great deal; attends school regularly. Appetite good and is looking well.
nd	Started work shortly after leaving as an iron moulder at Railway Signal Works, Fazakerley, for about one month, when pains in his stomach returned. Cannot trace him, but understand he has gone to sea as fireman.
18;	Cannot be traced, but known to be working.
ily	Whilst in Mill Road in 1906, suffering from tuberculous knee, his leg was amputated and a wooden leg substituted, consequently he has great difficulty in obtaining work. Could do light employment; does not cough much; not had occasion to see medical man; gained 19½ lbs.; follows our treatment; healthy neighbourhood; feeling better.
1;	Does not look strong, has weak chest; suffering from bronchitis since leaving Hospital; cough still troublesome; taking malt and oil; started work as cotton porter (casual). Adopts open air treatment; gained 23 lbs., lost 4 lbs. in weight; healthy surroundings.
..	Improved very much; only very slight cough; employed as van lad with Liverpool Parcels Delivery Co., constant; worked previously as jobber's labourer. Follows out open-air treatment; gained 13½ lbs. in weight, lost only 2 lbs.; surroundings good.
..	Resumed work as electric car conductor immediately after leaving hospital, and is feeling splendid.
..	Commenced working three days after leaving Heswall in a bottling store, and is still employed there. Has slight cough.
..	Working as porter at the docks for the Cunard Steam Ship Co.; intending to go to sea as steward in the coming spring. Feels ever so much better; gained 2st. 3 lbs., not lost any weight since. Cough rather troublesome.

INCLU

weeks aft
and sto
hree we
patient
to trac

th after
to Text

he day
e begin
work
to do m
has
ment.

informat
wo mo
when l
ed as a
seen he

le two
rk and
re he c
weeks
t three
ollowed

his dis
ital, w
place

his dis
re he
arge,

enced
Hesw
on the
re he r
t to w
a-half

oy, aft
nd bo
Fol
ry m

lle for
stewa
ved
th wa

in-la
ka, G
sligh
age.

his di
ter;

He se
k as
ble t
ning.

NEW YORK
LIBRARY
ASTOR LENOX AND
TILDEN FOUNDATIONS

INCLUSIVE OF, DECEMBER 1ST, 1906.

Visiting Officer's Report.

Weeks after leaving Heswall he went into Toxteth Park Hospital and stopped there until the end of September. After being three weeks he again went into Toxteth Park Hospital, and is a patient there; he looks in very bad health.

to trace.

th after leaving Heswall he caught a fresh cold, and had to go to Toxteth Park Hospital, where he has remained ever since.

the day he left Heswall till going into Toxteth Park Hospital, beginning of September, he was only able to do about one day's work (dock labourer) per week. After his discharge from Toxteth Park Hospital, at the end of October, he has not been able to do more than one day's work per week. He states that his health has failed very much since leaving Heswall. Follows treatment.

information was obtained from patient's father:—He was idle for two months after leaving Heswall; and up to three months when he deserted his wife, he had only been casually employed as a labourer. He was unable to do hard work. When seen he had a slight cough.

He two months after leaving Heswall; then got a situation as a clerk and has been employed ever since. He left his lodgings where he came to reside upon his discharge from Heswall about three weeks ago; his landlady informs me that when she saw him about three weeks ago he was not looking very well in health. Followed treatment whilst residing with her.

his discharge from Heswall he returned direct to Toxteth Park Hospital, where he remained until the date of his death, which place on the 6th August, 1906.

his discharge from Heswall he returned to Toxteth Hospital, where he remained until the 1st August, 1906, when he took his discharge, and since then I have been unable to trace him.

enced work as a dock labourer the day following his discharge from Heswall and after two days' work he was unable to continue, on the 24th August, 1906, he went into Toxteth Park Hospital, where he remained for nine weeks. Upon his discharge he again went to work at the docks, and has only been able to do a day-and-a-half's work ever since; follows treatment.

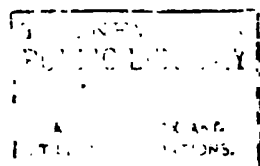
oy, after being at home about one week, went to work as a messenger boy at a grocer's shop, and has been employed there ever since. Follows treatment; surroundings exceedingly clean; health very much improved.

He four weeks after leaving Heswall; he then got employment as steward on the "Herefordshire," bound for Bangoon. A letter received from him on the 24th November, 1906, stated that his health was much improved.

in-law states he was employed as labourer at the Copper Works, Garston, for a month; at present idle owing to slackness. Slight cough but is looking well; been away for a short time. Follows treatment.

his discharge from Heswall this man went to reside in Manchester; address unknown.

He seven days after leaving Heswall; he then got two weeks' work as a butcher's assistant, and has been idle ever since. He is unable to do hard work; has a slight cough first thing in the morning. Follows treatment; surroundings exceedingly clean.



NEWS OF FORMER PATIENTS.

Name.	Union.	Discharged.	History.
J. W.	W.D.	September, 1905	Over last Spring. Wrote to Sister recently ; well, and working on board ship.
J. B.	"	March, 1904	Came over several months ago ; was very well, and working.
W. H.	"	January, 1904	Has been over, and is very well, and working.
J. McC.	L.	April, 1905	Is now porter to the Chemist in Heswall, and keeping very well.
M. B.	"	November, 1905	Is one of our most regular visitors ; cycles over. Keeps well, and works regularly.
J. N.	"	May, 1903	Came over this September, and is fairly well.
S. B.	"	April, 1904	I hear he is well, and working.
J. A.	T.	" 1905	Came over November 18, 1906 ; is well, and is out-porter at the Workshops for Blind.

TOTAL RESULTS.

Union.	Total.	Recovery, with fitness for work.	Arrest of Disease, with fitness for certain amount of work.	Improved, but no dependence on improvement being maintained.	No improvement.
West Derby ...	26	20	3	2	1
Liverpool ...	18	7	5	1	5
Toxteth ...	14	9	2	3	—
1906 ...	58	36	10	6	6

COPIES OF LETTERS RECEIVED FROM FORMER PATIENTS AT
HESWALL HOSPITAL.

Montreal Sailors' Institute,
Montreal.

s.s. "Tonian"

September 10th, 1906.

DR. RAW.

DEAR SIR,

I AM happy to say I am keeping in perfect health, as I have been doing all the year ; in fact I quite forgot I had a chest. My cough has gone away altogether. If I have time in Liverpool I shall take great pleasure in coming to see you, as I shall always say that you saved my life—thank God and you for it. Hoping you are well yourself, Sir, believe me to remain,

Respectfully yours,

WILLIAM J. MORRIS,
Late patient Mill Road and Heswall.

40, Shakespeare Street,
Everton,

DEAR DR. YEOMAN,

October 30th, 1906.

I SHOULD like to have seen you before leaving in order to have thanked you personally for your splendid treatment of me during the three months I was under your care.

We are told that "Out of the fullness of the heart the mouth speaketh," but it would take a much abler tongue or pen than mine to give full expression to my feelings of great joy and gratitude, to God first, to you second, as the instrument in His hands for my restoration to good health and strength once again.

I cannot speak too highly of the courtesy and kindness of yourself and Dr. Carlyle, or of the tender watchfulness and care shown towards each patient by the dear Matron and her able staff.

Heeswall Sanatorium will rank among the best in the land for good results whilst such a staff remains in charge.

With every good wish for your success, and in which I am most heartily joined by Mrs. Westthorp.

Believe me, dear Sir,

Very faithfully yours,

SAML. B. WESTTHORP.

P.S.—I have seen both Drs. Raw and Arkle, and they were both surprised and delighted with my appearance.

4, Trevelyan Street,
Breeze Hill,
Walton,

October 27th, 1906.

DEAR MATRON,

KNOWING the great interest you take in the welfare of your former patients it gives me great pleasure to inform you that I am at present enjoying better health than I have done for years.

I have left the Sanatorium now eleven months, and have been constantly working ever since. I cannot speak too highly of the benefit I have derived from treatment under your care.

Wishing you, dear Matron, and the Sanatorium every success,

I remain, yours obediently,

MARTIN BUCKLEY.

102, Gregson Street,
Liverpool,

November 3rd, 1906.

DEAR MATRON,

As I know what an interest you take in the old as well as the new patients, I am sure you will not object to my writing to let you know that I am keeping very well in health, and also still working at my trade. I have been a bit doubtful during the summer about this back end weather, and I have wondered how I would stand it, for there is no doubt that hard city work and damp wintry weather is the sure test for my complaint; but I must say, thanks to the course of treatment I received at the Sanatorium, that I feel stronger than I have been for years, and I have given it a good trial by now.

I know, of course, I would have had a much better chance of combating the complaint if I had an open air country job, which the Doctors told me was a necessity; but it is very difficult to get such a situation, although I mean to try hard next spring. I don't feel afraid now of the winter, as I am well backed up with my stay at Heeswall. I wish to take advantage of the present time to thank you, Nurses, Doctors, and all concerned for the benefit I received, and for which I will always feel very grateful.

Yours sincerely,

ALFRED C. MALLEY.

THE LIVERPOOL SANATORIUM IN DELAMERE FOREST.

(Founded in 1901.)

This sanatorium, which was erected in 1901 by the munificence of the late Lady Willox and of Mr. W. P. Hartley, is situated on "Rough Hill," Kingswood, in Delamere Forest. It is within a very short distance of the Manchester Sanatorium, which has been erected for the consumptive poor of Manchester through the generosity of Mr. Crossley of that city.

The sanatorium is regarded as an adjunct to the Liverpool Hospital for Consumption, founded as a charity in 1863 (page 410).

The site of the Delamere Sanatorium is at a considerable elevation. It commands an extensive view of the country to the south, including the city of Chester, and Eaton Hall, while the Welsh hills under favourable conditions of atmosphere can be discerned in the distance to the west. The grounds of the institution are well covered with fir trees and a rich undergrowth of ferns, &c.

The chief block (see plates*), which is a substantial and well-built structure and is devoted partly to the patients and partly to the officers, consists of a narrow three-storied structure, comprising wards and corridors so arranged as to secure for each and all of them ample through ventilation and abundance of light. The wards face south, and the corridors which give access to them, north. The wards afford a cubic space of about 1,000 feet per patient.

The ground floor of the chief block is occupied largely by the officers and the head officials; but there is, in addition, at a short distance from the sanatorium, a separate house for the Resident Medical Officer. At each end of the main building is a three-storied annexe, cut off by cross-ventilation from the wards, and affording bath-room and lavatory accommodation. The first floor of the block is devoted entirely to patients, and along with bungalows situated to the west of the main building affords accommodation for 40 patients. The third floor gives accommodation to the servants of the institution.

This number (40) of beds is insufficient to meet the demands made upon the institution; and in consequence Mr. Hartley generously offered to erect accommodation for 20 additional beds, provided the necessary current support in maintaining the patients can be procured. Unfortunately the Committee, in their annual report for 1903, had to write—

"Reviewing their financial circumstances the Committee, whilst heartily thanking those who generously responded to their appeal made last year for increased support, have not seen their way to accept the very generous offer of their President (Mr. W. P. Hartley) to increase at his own cost the accommodation for patients at the sanatorium."

* These plates have been reproduced, with consent, from photographs taken by Mr. E. Ormerod, of Frodsham.

Extending backwards from the centre of the sanatorium is a corridor leading to the patients' dining-room, the kitchen, and the general administration accommodation.

In front of the main entrance and extending to some distance on either side thereof is a glass-roofed verandah which affords useful shelter in times of rain, while in front of the first floor windows is a balcony running the whole length of the building.

The structural cost per bed was approximately £375, and the maintenance cost is about 37s. per week.

The water supply is derived from waterworks close at hand ; and lighting is by electricity.

Warming is by means of hot water pipes and radiators. Some of the wards have fireplaces, but the bungalows are unheated.

Results of the Treatment.

The following table has been compiled from the information furnished in the annual reports ; and I am indebted to Dr. Herapath Wood, the Medical Superintendent, for much additional information which he was good enough to give me at the date of my last visit to the institution.

Table showing Results "on Discharge" of Treatment during 1902, 1903, 1904, 1905 and 1906.

—	Cases.	Great Improvement.	Distinct Improvement.	Slight or no Improvement.	Deaths.
1902	125	74	33	17	1
1903	110	72	19	18	1
1904	135	96	23	14	2
1905	141	86	39	15	1
1906	131	87	25	19	0
Total... ..	642	415	139	83	5
Percentages		64.6	21.6	12.9	.8

Duration of Improvement.

In order that the Committee might be in possession of information relative to the lasting character of the "arrest" or "improvements" obtained by patients at the sanatorium, circulars were sent round in February, 1904, to all who since September, 1901, had left the sanatorium.



LIVERPOOL SANATORIUM.

(To face page 344.)



19650



BUNGALOWS AT LIVERPOOL SANATORIUM.

(To follow plate facing page 344.)

Of the 238 patients to whom the inquiry forms were sent all save 22 responded, and information obtained has been thus grouped by Dr. Wood.

113 in good health.	} In February, 1904.
37 in fair health.	
36 more or less invalids.	
30 have died (3 in the sanatorium).	
22 no information obtainable.	

238

As regards the 22 who failed to respond it would not, Dr. Wood tells me, be at all fair to assume that all, or even the majority, are dead. Some probably have died, but others are, he believes, at work. No further figures relative to "after-results" have been published in the annual reports.

Abstracts from Annual Reports of the Medical Officer.

In the first (1902) annual report, the Medical Officer, after referring to the short period of existence of the institution, adds—

"In the meantime my experience points to the fact that we do well in almost all instances with those patients who come to us in the earlier stages of the disease, which I believe, generally and readily responds to our treatment."

"On the other hand we are unquestionably severely handicapped with the more advanced cases which come to us. We can in many instances benefit such—in certain instances we may even arrest the progress of the disease—but so far our experience points to the fact that it is in this class that most of our failures and relapses occur."

* * * * *

"In the meantime I cannot but think that the best use will be made of our limited resources and accommodation by, as far as possible, giving preference to applicants in the earlier stages of the disease, and also to those who when they shall pass out of the sanatorium, can return to a more or less pure and healthy environment."

"I fear we can scarcely be sanguine enough to expect that patients who willingly or unwillingly return to the dirt and foul air from whence they have come, will escape relapses. Indeed, the complete object of such sanatoria as ours will not be fully effected until public opinion adopts its leading principles and applies them to a greater extent than at present is the case to the conditions which surround the daily lives of the people."

In his annual report for 1903, the Medical Officer records his appreciation of the fact that the proportion of early cases among the applicants has increased, and he expresses a hope that before long the sanatorium may be entirely filled with patients in the earlier stages of the disease.

In concluding his report he urges upon medical men who detect consumption in its earlier stages, and who desire for such patients sanatorium treatment, to send them to the sanatorium in that particular stage, which is the one which can be very hopefully grappled with. He also speaks highly in both of his earlier reports as to the educational value of the institution.

In his annual report for 1904, in commenting upon the result of the year's work, he observes—

The results, as in previous years, have been very satisfactory. A very large percentage (71·1 per cent.) have left in excellent health—not “cured” in the popular meaning of the word, but with the disease either quite or very greatly arrested and their prospects of life and wage earning assured or infinitely improved. I might here mention that the patients are frequently discouraged from the belief that complete cure is certain. We impress upon them the fact that complete cure only comes with prolonged arrest of the disease, and that the prolonged arrest greatly depends on their adherence to the principles of hygiene and pure air life which we teach them at the Sanatorium.

Dr. Wood adds that they are handicapped at the institution in several ways, viz. :—

1. The comparatively small proportion of early cases of consumption that apply. The majority of the accepted applicants have had the disease 18 months or over.

2. The frequent long waits of the applicants before admission.

3. The necessity of discharging patients too soon in order to make room for the waiting applicants. Many patients, therefore, suffer from the effects of our limited accommodation.

The following information with reference to the machinery for securing donations and annual subscriptions, and as to the privileges of donors and subscribers, as well as the terms of admission, may prove useful :—

Privileges of Donors and Annual Subscribers.

DONORS.

Every donor who gives £1,000 in one sum will, for life, be entitled to always have in the sanatorium one free patient. The said donor may have a bed known by such name as he or she may desire.

Every legacy of £1,000 (given for the purpose) will entitle the first named executor to a like privilege.

Every donor who gives £500 in one sum will, for life, be entitled to nominate a free patient for six months in each year, and may have a bed named after him or her, or by such name as he or she may direct.

Every legacy of £500 (given for the purpose) will entitle the first named executor to a like privilege.

Every donor who gives £250 in one sum shall be entitled to nominate a free patient for three months in each year.

Every legacy of £250 (given for the purpose) will entitle the first named executor to a like privilege.

Every donor who gives £100 in one sum shall be entitled to nominate a free patient for three months in each year, for a period not exceeding seven years.

ANNUAL SUBSCRIBERS.

Subscribers of 20 guineas per annum are supplied with thirteen monthly “Recommendation” forms, each entitling the patient to all the benefits of the sanatorium for a payment of 12s. 6d. per week.

Subscribers of ten guineas per annum are supplied with six monthly “Recommendation” forms.

Subscribers of two guineas per annum are supplied with one monthly “Recommendation” form.

Terms of Admission.

(a) The ordinary terms are £1 per week, for which no subscriber's recommendation is required.

(b) Patients recommended by subscribers pay 12s. 6d. per week, so long as the letter of recommendation is available. A new recommendation must be obtained each month, otherwise the charge will be £1 per week.

(c) Patients nominated to endowed beds are free.

(d) In order to meet the claims of all classes the Committee has agreed to allocate three rooms in the Main Building to patients who are able and willing to pay £3 3s. per week.

(e) Patients are only eligible provided they reside within 20 miles of Liverpool.

In the report for 1905 Dr. Wood, after insisting upon the immense boon which a sanatorium such as that of Delamere is capable of proving, adds :—

"But while recognising the benefits conferred by our sanatorium, it is well to recognise its limits; for, unfortunately, there are limits. Sanatoria cannot effect the impossible, namely, arrest advanced cases of consumption. Whereas nearly 100 per cent. of quite early cases are restored to complete, or almost complete, health, and of those in the second stage a large number are very greatly improved, only a few of the advanced cases derive more than a temporary benefit, the benefit as a rule not extending greatly beyond the period the patient is actually under treatment at the sanatorium."

The importance of securing early cases is well shown in the following table relative to the 1905 patients :—

Stage of Disease (Turban's Classification.)	Cases.	Results.
Stage I.... 	33	{ 31 very great improvement. 2 distinct improvement.
Stage II. 	47	{ 39 very great improvement. 8 distinct improvement.
Stage III. 	61	{ 17 very great improvement. 33 distinct improvement. 10 slight or no improvement. 1 death.

It is, as Dr. Wood observes, a significant circumstance that of the above 141 cases only 33 can be placed in Stage I. and 47 in Stage II., while as many as 61 have to be placed in the least hopeful stage.

In his annual report for 1906, the Medical Superintendent states that there has been an improvement in the character of the cases actually reaching the sanatorium.

"For instance, in 1905 for every 10 cases of quite early disease there were 34 with well-marked and old standing disease in which the prospects of recovery must needs be exceedingly doubtful; whereas in 1906 for every 10 early cases there have been only 16 of the doubtful class. This is evidently a step in the right direction, for in those earlier cases not only are the immediate results more satisfactory, but what is more important, the proportion of cases permanently restored to health is also largely increased."

THE CROSSLEY SANATORIUM.

(Opened March 31, 1905.)

This sanatorium takes its name from the donor—Mr. William J. Crossley, M.P., of Manchester—who, at the sole expense of himself and Mrs. Crossley erected, furnished, and presented it to the Manchester Hospital for Consumption and Diseases of the Throat and Chest. As already stated, the Manchester institutions for consumption now comprise an Out-patient department in Manchester itself, and an In-patient department, or sanatorium, at both Bowdon and Delamere (The Crossley Sanatorium) as well as beds at one of the Manchester isolation hospitals and a Home for advanced cases.

The sanatorium now in question is situated in Delamere Forest, Cheshire, at an elevation of 480 feet above ordnance datum, not far distant from the Liverpool Sanatorium described on page 343.

The institution can be reached either from Frodsham Station, which is about 4 miles north-east of the sanatorium, or from Mouldsworth Station, which is $3\frac{1}{2}$ miles immediately to the south.

The site, which is surrounded by an unclimbable iron and wire fence, consisted originally of some 66 acres of oak and chestnut forest, some 10 acres of which have been cleared of timber to afford space for the erection of the sanatorium buildings, and to provide free circulation of air and a pleasant vista around the institution. From the sanatorium, and from the terrace in front of it extensive views over the country to the south may be obtained in clear weather.

The sanatorium, the façade of which is 100 yards long, and which faces almost due south, is a handsome and imposing three-storied structure providing accommodation for 90 patients for a resident medical director and two assistant medical officers. The nurses and ward maids are housed in a separate institution known as the Nurses' Home.

The accompanying illustrations—for permission to reproduce which, as also for much other assistance, I am indebted to Dr. Lloyd Smith, the resident medical director—convey a good idea of the general arrangement of the sanatorium.

Forty-five of the beds are for males and forty-five for females. Thirty-six of this total are reserved for private patients paying from two to three guineas weekly, the remainder being for patients of the poorer class who are sent in through the Manchester Hospital for Consumption.

The Manchester Corporation makes an annual contribution of £1,000, and for this sum is entitled to send 20 patients, who



THE MANCHESTER (CROSSLEY) SANATORIUM, DELAMERE FOREST.

(To face page 348.)

must be of the poorer class, and whose sputum on examination must have yielded tubercle bacilli. These patients are sent through Dr. Niven to the Out-patient Department, where the question of their suitability for treatment is decided by the honorary staff. If admitted to the sanatorium a report is sent by the medical director to Dr. Niven both on admission and on discharge.

The total accommodation at the Delamere Institution consists of four wards containing six beds each, ten with four beds each, one with two beds, and twenty-four with single beds. Patients paying two guineas weekly are accommodated in a six-bed ward, those paying two and a half guineas in a four-bed ward, while those paying three guineas have each a private room.

All the wards face southwards, there being to the north of the wards a very well-lighted corridor affording access to the wards from that side, and providing for thorough through ventilation (see ground plan facing page 350).

Northwards of the corridor are two annexes comprising bathroom and lavatory accommodation, and others containing storerooms and offices. At each end of the building on the lower floor are day-rooms with bay-windows for the accommodation of the patients.

The amount of space accorded to each patient in the wards is approximately 1,800 cubic feet. But each ward is provided with casement windows constructed in such fashion as to enable the beds to be easily wheeled on to the spacious balconies with which practically all the wards are in communication, and on which the patients while still in bed, or lying at full length on a couch, may enjoy the fresh air and the pleasant surroundings.

To the north of this main building, but connected therewith by a covered corridor, is a block comprising what may be termed the administrative offices, and containing besides a handsome chapel a common dining-hall measuring 60 feet by 40 feet. The tables on one side of this dining-hall are reserved for paying patients, but the food is identical in quality at all the tables.

In addition, this block contains the nurses' dining-room, the kitchen, and other offices.

Northwards again of this block, but completely separated therefrom, is a building comprising the laundry, disinfecting apparatus, engine and boiler house, and stables; while to the east of this block is a thoroughly up-to-date sputum sterilizing room, bacteriological laboratory and an autopsy chamber.

To the west of the block are cottages for the attendants, and further west again the Nurses' Home. This home contains forty-six rooms, a number considerably in excess of the immediate needs of the sanatorium. It is anticipated, how-

ever, that in the future a material addition to the number of beds in the institution may be made by the erection of chalets in the grounds.

To the south of the sanatorium are numerous shelters, some fixed and some revolving; the shelters to the west being for females, those to the east for males. The Director is in favour of shelters to hold 4-12; or *liegehallen* for 24, as being more easily administered, cleansed and lighted. Water should, he thinks, be always laid on to the shelters.

Warming is by means of hot-water radiators and lighting by electricity, the engine-house containing two sets of generator plant, the one driven by steam, the other by gas, this latter being provided as being likely to prove more economical than steam during the summer months.

Water is derived from a well sunk on the estate to a depth of 504 feet into the subjacent New Red Sandstone formation. The pumping machinery necessary to raise the water to the reservoir may be driven either by an oil engine in the pump-house or by the electric plant in the common engine-house. By this means water may be pumped directly into the mains in the event of fire, while the building itself is liberally furnished with fire hose and outside fire escapes.

The sewage is disposed of on the site, but at a sufficient distance from the sanatorium, by means of septic tanks and biological filters, the effluent being led to an adjoining gravel area and allowed to percolate therein.

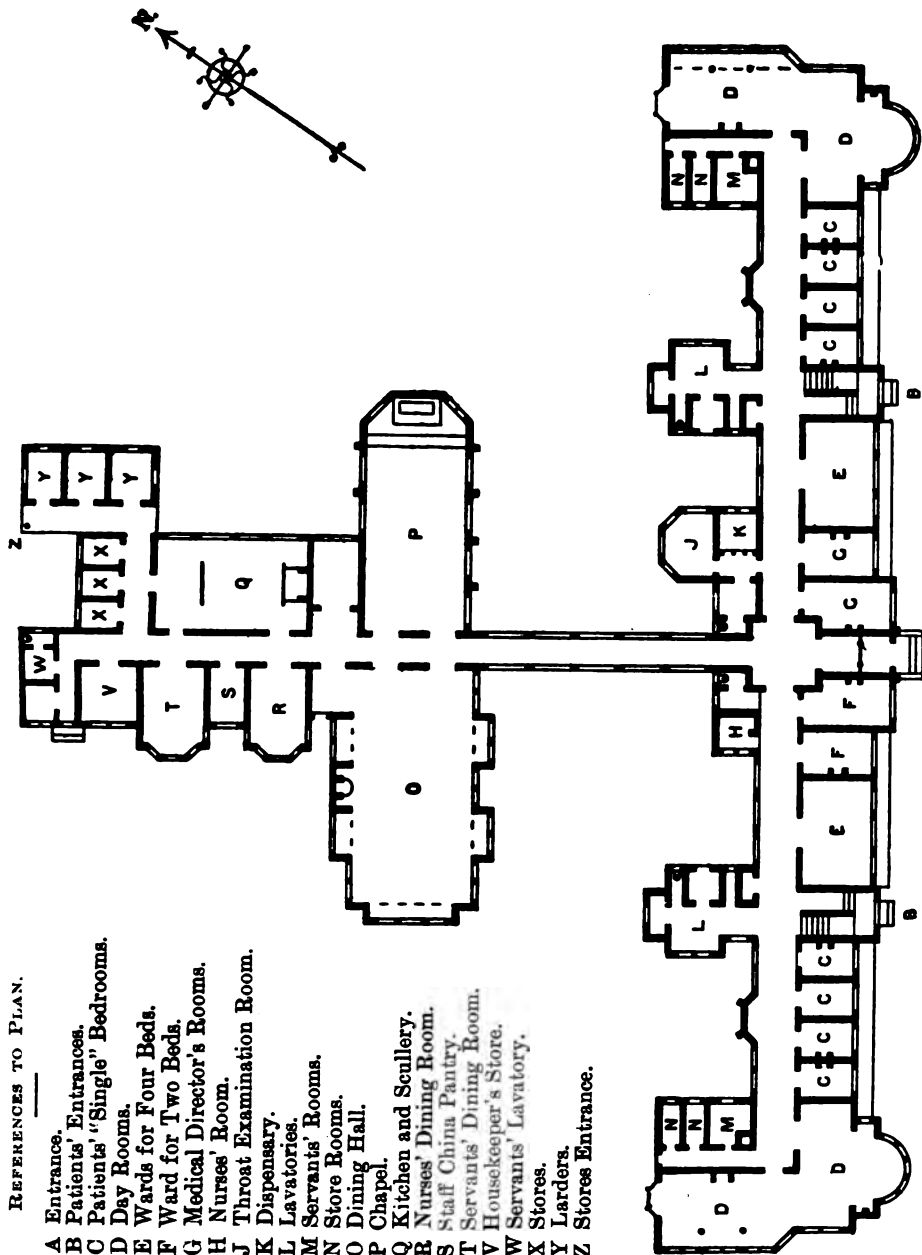
There is an excellent operating theatre, with grey-coloured and washable walls, furnished with all the latest devices for the examination of larynx, throat and nose, and for the aseptic performance of any operations.

In the basement, to which abundant air and light is afforded, are consulting rooms, together with provision for hydro-therapy and the application of the X rays. Here, too, are the cloak-rooms wherein the patients keep their wraps and rugs.

The provision for hydro-therapy is very complete, comprising dressing cubicles for men and women arranged on either side of and communicating with the middle or Douching Room where the apparatus is fixed. The baths consist of sitz, shower, needle, wave and spray apparatus, all these being controlled from a central stand, whence the temperature and pressure can be duly regulated. The baths are administered by one of the Medical Officers, a sister being in attendance on the women's mornings. The Medical Director is of opinion that for combating tuberculosis the best means which are at present at our disposal consist of fresh air, regulated exercise or light work, a suitable dietary, and hydro-therapy. He attaches much importance to the latter agency in promoting a healthy action of the skin in eliminating effete material and relieving the kidneys and lungs, while in addition it produces, he considers, an improved tone of the whole muscular

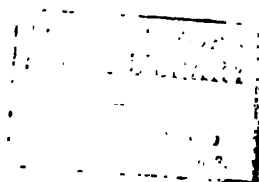
REFERENCES TO PLAN.

- A Entrance.
- B Patients' Entrances.
- C Patients' "Single" Bedrooms.
- D Day Rooms.
- E Wards for Four Beds.
- F Ward for Two Beds.
- G Medical Director's Room.
- H Nurses' Room.
- J Throat Examination Room.
- K Dispensary.
- L Lavatories.
- M Servants' Rooms.
- N Store Rooms.
- O Dining Hall.
- P Chapel.
- Q Kitchen and Scullery.
- R Nurses' Dining Room.
- S Staff China Pantry.
- T Servants' Dining Room.
- V Housekeeper's Store.
- W Servants' Lavatory.
- X Stores.
- Y Larders.
- Z Stores Entrance.



PLAN OF THE MAIN BUILDING (Crosley Sanatorium).

(To face page 350.)





ONE OF THE WARDS AT THE MANCHESTER (CROSSLEY) SANATORIUM SHOWING PATIENTS ON VERANDAH
AND NATURE OF FURNITURE, ETC.

(To follow plan facing page 350.)

system. Those patients only who are on the high road to recovery are given these baths.

It may be noted that the poorer patients are restricted to the grounds of the institution, whereas the paying patients are allowed to take certain prescribed walks outside these grounds.

Visitors are allowed as a matter of routine on the last Saturday in the month.

Endowment of the Institution.

Mr. Crossley having presented the sanatorium complete to the Manchester Hospital for Consumption it has devolved upon that hospital and upon the people of Manchester to maintain the sanatorium in such fashion as to enable the consumptive poor of that city to derive adequate benefit from it.

It is estimated that in order to keep the beds in the institution fully occupied an annual expenditure of approximately 7,000*l.* will be necessary. With a view to securing this income appeals have been made which had resulted at the date of issue of the annual report for 1905 to 70,025*l.* (a.)

The founder of the institution thinks that it will be possible to accommodate 200 patients every year.

The average cost per head per week, for food (including patients and staff) amounts to 10*s.* 10*d.*, the several items costing as follows: Meat 4*s.* 7½*d.*; milk 1*s.* 2*d.*; eggs 3*d.*; fish and poultry 1*s.* 0½*d.*; bread 9½*d.*; groceries, &c. 3*s.* 1*d.*; vegetables 3*d.*. The total weekly cost per patient (inclusive of rent, rates, water, light, coal, salaries, wages, food, &c.), is £1 13*s.*

Conditions of Admission.

The poorer patients are all admitted through the Manchester Consumption Hospital, as already said. The routine of admission was in the first instance as follows:—

Patients who, on examination in the out-patient department, appeared to be in such a condition as to hold out a reasonable prospect of deriving benefit from the open-air treatment, were sent in the first instance to the in-patient department at Bowdon, near Manchester, an institution which, until the Crossley Sanatorium was opened, has served to provide the only open-air treatment which it was possible for the poorer classes of Manchester to secure. Patients sent to Bowdon on probation had their general health improved, and their teeth attended to, so that such patients if sent to Crossley might be able to profit to the full by the conditions which obtain there.

Before, however, a patient could be sent to occupy a bed at Bowdon it was necessary that the recommendation of the Honorary Medical Officer who first saw the case should be independently

(a) Amongst the donations I notice one of 250*l.* from the Lancashire County Council.

countersigned by another member of the medical staff. In this manner it was hoped to limit the admission to early and suitable cases.

If, at the end of a month's stay at Bowdon, such patients showed a tendency to react favourably they were drafted as opportunity offered to the Crossley Sanatorium, where they were kept for varying periods according to the progress which they appeared to be making. If the case did badly, and was, in the opinion of the Medical Director and Visiting Physicians, likely to derive no benefit from a longer stay, the patient was discharged.

This arrangement was not, however, found to work in a very satisfactory fashion, and at the present time patients for either Crossley or Bowdon are sent direct to these institutions through the agency of the Manchester Out-patients Department.

With regard, too, to the private patients, *i.e.*, those who pay from 2 to 3 guineas a week, no such method of selection obtains; all cases which are in the least degree suitable are admitted no matter from what part of the country they come.

Routine Treatment in the Sanatorium.

Each patient on admission is provided with a card, which, in the case of those patients who are not confined to bed, is carried in the pocket. The cards are of different colours, according to the phase of the disease, and copies of two such cards are annexed to this account in order to convey an idea of the daily routine of life at the sanatorium (see last page of Crossley section).

Employment of the Patients.—Dr. Lloyd Smith tells me that so far as practicable he makes a point of encouraging all patients who are able to do work to take up some definite duties during their sojourn in the sanatorium. He regards this work as a means of gradually accustoming the patient to the conditions to which he will in all probability be exposed on leaving the institution; for he thinks that a sudden change from absolute rest to full work is likely to promote a relapse. With a view of gradually accustoming patients to work while within the institution, all "free" patients, both male and female, are required to make their own beds and thoroughly cleanse their rooms by means of damp dusting; this latter practice is with view of inculcating into the patients the danger of dust infection.

The female patients, when not exercising, are encouraged to perform housework, and are shown not only the best methods of cleansing but also how to cut out simple garments and to knit stockings. They are also instructed in the general principles, nutritive value, and cost of the dietary in use in the sanatorium.

The male patients, in addition to the duties relating to their wards which have already been referred to, are encouraged to make use, under supervision, of any special knowledge or experience which they may possess. For example, those who



NURSES HOME AT THE MANCHESTER (CROSSLEY) SANATORIUM.

(To face page 352.)



SHELTER AT CROSSLEY SANATORIUM.

(To follow plate facing page 352.)

possess a mechanical turn of mind are sent to the engine house, laundry, and pump house, where, under the supervision of the engineer, they clean brasses, gauges, &c., and are instructed in the use of the sterilizing apparatus. Others are employed in the stables or on the sewage farm, or in hay making, stone picking, &c., while some are given the care of the poultry. It is proposed in the near future to commence a "colonie agricole" comprising a kitchen garden, &c.

Each morning a special list is made out by the Medical Director as to the work, if any, to be performed by each patient.

Dr. Lloyd Smith's object is, as has been said, to encourage all patients to engage in some occupation in order that they may not degenerate into chronic invalids and loafers liable on leaving the institution to become a charge upon the rates or a burden on their friends.

A fire drill in which all the patients take part is conducted once a month, and such drill is regarded as being eminently conducive to the promotion of the faculty of self-reliance. During this drill the patients must exercise their own initiative and are unable to rely upon the nursing staff for direction and advice. The cleansing of the shelters also devolves upon the free patients.

Each male patient is given a removable pocket lining in which he carries his day flask, thermometer, routine card, and handkerchief. The latter, which is composed of cheap and soft material of muslin tissue, is supplied clean daily by the sanatorium. The women have bags and waist belts. Handkerchiefs are collected every night by the monitor or monitress of the floors, who procures from the sisters clean handkerchiefs and a brown paper bag. A clean handkerchief is given to each patient and the soiled handkerchiefs are placed in the brown paper bag. These bags are collected by the porter, in the morning, and taken direct to the boiler fires. Clean pockets and bags are handed to the patients every Sunday morning, when an inspection is held by the medical officers.

All patients' clothes and linen are sterilized and laundried by the sanatorium on admission, a small charge of 3d. per person being made. Similarly when a patient leaves the institution all the bedding, mattresses, outdoor rugs, and pillows are "stoved," and the room which the patient has occupied is disinfected with formalin vapour, the walls having been previously sprinkled with water up to the dado level.

Collection and Disinfection of Sputum.—The vessels into which the patients expectorate are of the simplest pattern and, hence, easily cleansed; the night mugs being of two colours, white for men and green for women. These mugs, which have loose-fitting lids, have affixed to the handles metal labels with numbers punched therein which correspond to the number of the bed occupied by the patient.

Every morning the sputum porter brings on his trolley clean flasks and mugs from the Research Block, distributing them and collecting the soiled ones of the preceding 24 hours. The soiled vessels are taken to the sputum sterilizing room attached to the Research Block, where some soda solution is first run into each flask or mug, these being then placed in trays in the sterilizer when they are sterilized by superheated steam. In this apparatus there is a thermometer which dips into the liquid in one of the mugs, and when the temperature of this liquid is raised to 220° F. an electrical connection is made which causes a bell to ring, after which this temperature is maintained for twenty minutes.

The sputum of patients in which the bacillus tuberculosis has not been found is examined almost daily by one of the head officers, and in this way some portions of the sputum is often found to yield a positive result.

The tables furnished later relate to the Crossley and Bowdon cases considered separately, but in examining such tables it should be borne in mind that rather less severe cases are, as a matter of routine, sent to Crossley than to Bowdon, and that the tabulation at each institution is made by different medical men. As the Annual Report for 1905 states: "It is hardly to be expected, in passing a verdict whether the cure of the tubercular condition of the lungs has been complete or not, that two separate persons would by any means always be in agreement."

The same annual report contains the following comments relative to the subsequent history of patients discharged from Crossley and Bowdon sanatoria :—

"Whilst the good results obtained by the treatment of patients, both at Bowdon and Delamere, are quite equal to those met with not only in sanatoriums in this country but also on the Continent, the Medical Board regret to record that after a short interval, they see the patients only too frequently relapse into their former condition. They are confident that this occurrence cannot to any great extent be due to re-infection, since in Manchester, more particularly, it is customary to disinfect the homes on the removal of the patients to the sanatorium. Nor is it to be supposed that the patients so soon after discharge can have disregarded the advice so carefully and persistently given to them during their stay at the sanatorium and at the time of leaving. The patients know the necessity of continuing the same hygienic measures to which they have learned to adapt themselves at the sanatorium, viz., to sleep with open windows, to keep their living room well ventilated, to destroy their sputum, &c., so that it might be inferred that the ill-effects which show themselves so rapidly in these patients on returning to their homes are mainly to be attributed to their occupations or the poverty of their circumstances.

"It is therefore a great desideratum that something more should be done for suitable selected patients after leaving the sanatorium."

During 1905 Dr. Lloyd Smith, the Medical Director of the Crossley Sanatorium, adopted Turban's classification of cases based upon the extent of lung involved, and although this classification is relatively a somewhat arbitrary one, there is much to be said in its favour. It is as follows :—

1. Cases in which not more than one lobe is affected, or of two lobes only an amount equivalent to one lobe in extent.

2. Cases in which two lobes are rather more extensively involved; and

3. Cases in which the disease is still further advanced.

The following are the figures as regards results for 1905 and 1906:—

1905.

	Stage 1.		Stage 2.		Stage 3.		Totals.	
	Delamere.	Bowdon.	Delamere.	Bowdon.	Delamere.	Bowdon.	Delamere.	Bowdon.
Cured ...	23	9	2	—	—	—	25	9
Much improved...	33	32	5	9	—	—	38	41
Improved ...	13	28	11	57	23	7	47	92
Stationary ...	6	10	9	29	36	21	51	60
Worse ...	—	1	—	6	2	9	2	16
Dead ...	—	—	—	1	2	—	2	1
Totals ...	75	80	27	102	63	37	165	219

1906.

Apparently cured.	19	8	—	6	—	—	19	14
Much improved...	10	17	8	34	1	12	19	63
Improved ...	10	9	9	31	9	16	28	56
Stationary ...	5	3	17	19	17	29	39	51
Worse ...	—	—	—	4	4	15	4	19
Dead ...	1	—	—	—	—	1	1	1
Totals ...	45	37	34	94	31	73	110	204

The figures for Crossley during 1905 are for nine months only, i.e., from March 31st to December 31st. During this nine months 65 patients were transferred from Bowdon to Crossley so that this number should be deducted from those admitted and discharged to obtain the figures representing the cases actually treated.

The circumstance that in 1905 the percentage of cases in the third stage at Crossley is a high one appears inconsistent with the fact that the most favourable cases are sent to Crossley, but the explanation is, it seems, to be found in the fact that 20 of the Crossley beds are maintained by the Manchester Corporation and that the patients sent by the Corporation are admitted "even although the disease is in a more advanced state than is usually considered suitable."

The figures for Crossley during 1906 relate only to those cases which were admitted through the Manchester Out-patients Department and are exclusive of the Corporation cases and the private patients, as well as of 38 cases the tuberculous nature of which was doubtful. Similarly the Bowdon figures exclude 26 doubtful cases.

The following table relates to gains and losses in weight.

1905.

—		lbs. 1-5.	lbs. 5-10.	lbs. 10-15.	lbs. 15-20.	lbs. Over 20.
Bowdon ...	{ Gain ...	79	77	43	20	6
	{ Loss ...	18	2	0	0	0
Delamere	{ Gain ...	43	44	33	10	6
	{ Loss ...	12	1	0	0	0
Stationary		10	—	—	—	—
1906.						
Bowdon ...	{ Gain ...	55	73	46	27	9
	{ Loss ...	13	1	—	—	—
Delamere	{ Gain ...	34	42	38	11	2
	{ Loss ...	12	1	—	1	—

Presence or Absence of Tubercle Bacilli.

The following data as regards percentage of cases yielding tubercle bacilli are of considerable interest from the point of view of the influence of sanatoria in preventing the spread of pulmonary tuberculosis. They apparently relate to the condition as regards bacilli at the time of, or since admission.

1905.	Crossley.	Tubercle bacilli found in 75% of 175 cases.			
"	Bowdon.	"	"	"	66% of 266 "
1906.	Crossley.	"	"	"	60·8% of 148 "
"	Bowdon.	"	"	"	60·0% of 230 "

Presence or Absence of Hæmoptysis.

1905.	Crossley.	Hæmoptysis had occurred in 53% of the cases.			
"	Bowdon.	"	"	"	42% " "
1906.	Crossley.	"	"	"	41·9% " "
"	Bowdon.	"	"	"	46·0% " "

During 1906 a few selected cases were treated with tuberculin, such treatment having been carefully regulated by observations on the opsonic indices of the patients. The cases were mainly those which presented obvious lesions of the throat, glands, or nose, but many of these cases also suffered from pulmonary tuberculosis of a more or less advanced nature and such cases derived much less advantage from this treatment than did those whose lungs were relatively little affected,

CROSSLEY SANATORIUM.**DAILY ROUTINE. (R.)**

Date of Admission.....
 For..... No..... Phys.....
 Room..... Shelter..... Date.....

TIME.	1 PINT HOT MILK COCOA; "SNACK" SERVED. Temperature and Pulse to be observed. Doctor's Visit. INSTRUCTIONS FOR THE DAY GIVEN. TIME AND KIND OF BATH ORDERED.
6.45 a.m.	TO DRESS.
7.0 to 7.30	REST ON LOUNGE ON BALCONY.
7.30 to 8.0	BREAKFAST.
8.0 to 8.30	REST—BALCONY OR SHELTER.
8.30 to 9.0	LUNCH SERVED—1 PINT MILK (HOT OR COLD), BREAD AND BUTTER OR FRESH.
9.30 to 10.30	REST—SHELTER OR BALCONY.
10.30	Temperature to be observed.
10.30 to 12.15	MID-DAY MEAL—DINNER.
12 noon	REST—SHELTER OR BALCONY.
12.30 to 1.30	Temperature observed.
1.30 to 3.30	TEA SERVED.
3.30 to 4.0	REST—SHELTER OR BALCONY.
4.0 to 6.0	EVENING MEAL—MEAT TEA, DINNER, OR HOT SUPPER.
6.30 to 7.0	LEISURE HOUR. VAPOUR OR USUAL BATH GIVEN.
7.0 to 8.0	1 PINT MILK; "SNACKS" SERVED.
8.0 to 9.0	Temperature and Pulse to be observed.
9.0 to 9.30	Doctor's Visit.
9.30	LIGHTS OUT.

N.B.—You are required—

1. To observe a record of your own temperature.
2. To keep the thermometer under your tongue with lips closed for 10 to 15 minutes.
3. To carry this card with you. Bring it to every consultation, and produce it to the Medical Officers when asked for.
4. If this card be mislaid or torn, at once to apply for another.

CROSSLEY SANATORIUM.**DAILY ROUTINE. (E.)**

Date of Admission.....
 For..... No..... Phys.....
 Room..... Shelter..... Date.....

TIME	1 PINT HOT MILK COCOA; "SNACK" SERVED. Temperature and Pulse to be observed. Doctor's Visit. INSTRUCTIONS FOR THE DAY GIVEN. TIME AND KIND OF BATH ORDERED.
6.45 a.m.	TO DRESS.
7.0 to 7.30	EXERCISE OR SHELTER OR LIGHT WORK.
7.30	BREAKFAST.
8.0 to 8.30	EXERCISE.
8.30 to 9.0	LUNCH. 1 PINT OF MILK. "SNACKS"
9.30 to 10.30	EXERCISE.
10.30 to 10.45	REST.
10.45 to 11.30	MID-DAY MEAL—DINNER.
11.30 to 12.15	REST OR SHELTER OR DAY-ROOMS.
12.30 to 1.30	EXERCISE.
1.30 to 2.30	TEA.
2.30 to 3.30	EXERCISE OR LIGHT WORK.
3.30 to 4.0	EVENING MEAL—MEAT TEA, HOT SUPPER, OR DINNER.
4.0 to 6.0	LEISURE HOUR.
6.30 to 7.0	1 PINT MILK; "SNACKS" SERVED; BATHS IF ORDERED.
7.0 to 8.0	Temperature and Pulse to be observed.
8.0 to 9.0	Doctor's Visit.
9.0 to 9.30	LIGHTS OUT.
9.30	

N.B.—These instructions are to be implicitly carried out.

The slightest fatigue, indisposition, or failure to be personally reported to the Medical Officers.

This card to be always carried with you, and to produce it to the Medical Officers when asked for.

If this card be mislaid or torn, you are at once to apply for another.

THE CUMBERLAND (BLENCATHRA) SANATORIUM.

(Opened October 4th, 1904.)

This institution, which has been promoted by the Cumberland Branch of the National Association for the Prevention of Consumption, is situated at an elevation of about 900 feet above ordnance datum on the southern slopes of Blencathra, from which it commands an imposing view of Helvellyn, of Scawfell, as also of Lake Derwentwater. It is easily reached from Threlkeld station, from which it is distant only two miles. Its surroundings are well shown on the accompanying plate.

The institution, which faces due south, consists of an administrative block providing accommodation for the staff, and of a wing, on each side of this building and communicating therewith by a covered corridor, each wing comprising ten cubicles. One wing is for males, the other for females. To the east of the male wing are six sleeping huts for males, and in the grounds there are four shelters. The total accommodation was in the first instance 20 beds, but it has now been increased to 28.

The small photograph annexed, for which I am indebted to Dr. Goodchild, the Resident Medical Officer, shows the administrative block and the wings, but it does not include the sleeping huts and the shelters.

A house already existing on the estate which had to be purchased with the sanatorium site, has been converted into a residence for the Medical Officer, and another previously existing building has been modified for use as a laundry. A cottage for the caretaker has been recently erected.

The administrative block is a permanent structure of stone; the wings, which are "temporary" structures, consist of wire-wove material and matchboarding. Each wing is provided with an annexe comprising baths and lavatories. The windows of the cubicles reach to the ceiling, the lower and upper portions being in four casements. The air space for each patient is in the cubicles 1,300 cubic feet; in the huts from 500 to 750. These huts are, however, quite in the open air.

Through ventilation at all times of each cubicle is provided for by means of an open space over the door, which communicates with the corridor.

Hot water is used for warming purposes, and lighting is by means of acetylene gas. It is hoped eventually to instal electric light.

The water supply is derived from a spring in the grounds and the sewage is disposed of by means of a septic tank and bacteria beds.

The cost of maintenance was estimated at 30s. per week per patient, and it was hoped that local authorities would secure the



THE CUMBERLAND (BLENKATHRA) SANATORIUM.

(To face page 358.)



THE CUMBERLAND SANATORIUM.

4

sole use of beds at the rate of £78 per bed a year. The Carlisle Board of Guardians sent in four patients at a cost of 30s. each per week shortly after the opening of this institution. The local sanitary authorities subscribing during 1905 were the Egremont and Penrith Urban District Councils.

Experience has, however, shown that the inclusive cost of each patient per day averages 4s. 11d.

But the loss thus involved on Cumberland patients at 30s. per week may, the second annual report states, be balanced by the gain on patients who are taken from outside the county at a charge of two guineas weekly, and now that there are 28 beds it is expected that more outside patients will be admitted, and the adverse balance wiped out.

Dr. James Bird, the Hon. Sec., to whom I am indebted for assistance, tells me that as the Sanatorium Committee have been able to let a large portion of the whole estate (40 acres) which they were compelled to purchase, the original 20 beds (exclusive of the six sleeping huts), with the land upon which the buildings stand, may be regarded as having cost £6,000, *i.e.*, £300 per bed.

He further points out that as there is a good kitchen and dining-room, and as sleeping huts can be erected for £20 each, it will be feasible, if necessary, to provide in all 40 beds for a capital sum of £6,600, or £165 per bed.

If the cost of the existing buildings and the whole site be included, and 20 more beds be added at an outlay of £600, the cost per bed would work out at £240. It has also to be pointed out that the Committee derives a rent of £45 per annum from letting land not wanted for the purposes of the institution.

Results.

The Committee express, in the first annual report, regret that there is difficulty in securing patients in the early stages of the disease, and they point out that the working classes as a rule omit to seek medical advice until the disease is advanced and the patient incapacitated for work. As a consequence of this practice the Committee, in order to keep the beds filled, have admitted several cases which were not of a very promising nature, and the Committee urge all persons who are suffering from cough and are failing in health to seek medical advice in order that, should it be found that they are suffering from consumption, they may obtain treatment while there is a chance of cure.

In their second annual report the Committee again state that they have great difficulty in securing patients in the *early* stages of the disease, and consequently they have, in order to fill the beds, been obliged to admit more or less advanced cases "with the consequence that the Sanatorium statistics are made to

appear not very favourable." They add, however, that they are encouraged by the results of the work as a whole curative and educative, and they quote certain illustrative cases.

The following table is taken from the second annual report:—

Class.	Total Admitted.	Total Discharged.	Maintaining Treatment.	Well.	Fairly Well.	Ill.	Dead.
I.	16	14	13	14	—	—	—
II.	56	46	33	20	15	7	4
III.	20	20	11	4	6	2	8
Totals	92	80	57	38	21	9	12

Discharged over two months and keeping-up treatment.

Class.	Total.	Well and Working.	Percentage.
I.	11	11	100
II.	23	19	86
III.	10	6	60
Total ...	44	36	81.8

The report adds—

"In other words, if the patients after treatment are conscientious, there is great probability they will be able to do wholesome work. Most of the ex-patients who are working are following their old occupations, which include engineering, grocery, drapery, electrical engineering, plastering, iron-working, steel drilling, locomotive fireman, tailoring, laundry work, domestic service, carpentering, insurance agent, sweetmeat making, schoolmaster, textile designing, clerk, printing, housekeeper. Many of these are not ideal, but the patients are doing their best to improve the conditions of work."

It will be seen by the tables which follow that in the majority of the Class I. cases, no tubercle bacilli were found, and it will also be seen that in Class III., in which the disease was seriously complicated, bacilli were frequently not found, although there was extensive disease of the lungs. These tables are also of interest in that they indicate whether or not the patient is maintaining the treatment after he has left the sanatorium.

Report of Cases.

CLASS I.—DISEASE SLIGHT.

Registered No.	Days in Rana-torium before 1906.	Days in Rana-torium in 1906.	Gain in lbs. to December 31st, 1905.	On Admission.			Months since dis-charge.	Case No.	Total Gain in lbs.	T= Maintaining the Treatment.
				Tubercle Bacilli. P Present. A Abundant. V A Very abun- dant.	Duration of Disease given.	State.				
1 F	75	110	—	Not found	6 months	Consolidation and slight softening.	8	22	36'25	Very well, working as kitchen maid. T.
4 F	55	—	—	Not found	3 years ..	Consolidation in one lung ..	13	3	21'75	Very well, able to work. T.
9 M	67	46	—	P	6 months	Slight consolidation and slight softening.	11	9	19'25	In good health, working 10 hours per day. T.
19 F	13	79	—	Not found	2 years ..	Consolidation in both lungs ..	10	18	18'50	Very well, working all day regu-larly. T.
21 F	13	92	—	No sputum	2 " ..	Consolidation in one lung ..	9	19	27'50	Very well, working in service. T.
28 F	—	101	—	No sputum	12 months	Consolidation in both lungs ..	7	25	17'00	In very good health, working 84 hours in factory. T.
35 M	—	96	—	No sputum	24 " ..	Consolidation in both lungs ..	7	31	17'75	Very well, working full time. T.
36 F	—	78	—	Not found	3 years ..	Consolidation in both lungs ..	7	30	11'00	Very well, working all day in service. T.
53 F	—	53	—	Not found	3 months	Consolidation in one lung ..	6	36	11'00	Well and working when lately heard of. T.
53A (9) M	See 9	113	—	V A ..	See 9 ..	Slight softening and slight con-solidation.	4	38	18'50	See 9.
61 F	—	29	—	Not found	7 months	Slight consolidation in both lungs.	5	47	7'50	Well and working. T.
63 M	—	29	—	Not found	2 " ..	Slight consolidation in one lung	5	50	17'25	Very well, working all day. T.
81 M	—	83	—	Not found	6 years ..	Consolidation in both lungs ..	4	83	6'50	Recently discharged. Very well. T.
84 F	—	29	—	Not found	12 months	Slight consolidation in one lung	2	76	3'75	Well and able to work.
88 M	—	51*	8'50	Not found	5 " ..	Consolidation in both lungs ..	Still in	—	—	—
90 F	—	30*	4'00	Not found	2 " ..	Slight consolidation in both lungs.	"	—	—	—
91 F	—	23	—	No sputum	2 " ..	Consolidation in one lung ..	0	85	9'75	Recently discharged. T.

CLASS II.—DISEASE MORE EXTENSIVE.

Registered No. and Sex.	Days in Sanatorium before 1906.	Days in Sanatorium in 1906.	Gain in lbs. to December 31st, 1906.	On Admission.			Months since discharge.	Case No.	Total Gain in lbs.	Treatment.
				Tubercle Bacilli. P Present. A Abundant. V A Very abundant.	Duration of Disease given.	State.				
3 M	75	45	—	V A	3 years ..	Softening in both lungs ..	10	14	14'25	Died some months after leaving.
6 M	73	123	—	P	3 " ..	Softening and consolidation. Fever.	7	26	14'25	Very ill.
7 F	60	185	—	A	6 months	Consolidation in both lungs ..	5	43	44'75	Satisfactory, able to do light work.
8 M	68	108	—	A	15 "	Consolidation in both lungs ..	5	43	33'75	Good, working all day and supporting family. T.
11 M	59	72	—	V A	10 "	Small cavities in both lungs ..	10	17	39'50	Very well, able to do his work. T.
13 P	55	140	—	A	12 "	Extensive consolidation in one lung.	7	27	7'00	Has been working 6 months; see No. 82A.
14 M	54	59	—	A	2 years ..	Softening and cavity; hæmoptysis.	11	13	10'00	Not well.
15 M	54	59	—	A	9 months	Consolidation in both lungs ..	11	11	13'50	In moderate health, has done some work. T.
16 M	38	57	—	P	3 "	Consolidation in both lungs ..	11	10	24'75	Very well, working 9½ hours, supporting family. T.
18 M	18	68	—	P	5 months	Small cavities in both lungs ..	10	15	18'50	Very well, working 8½ hours, supporting family. T.
22 P	13	291	—	No sputum ..	18 "	Softening in both lungs ..	2	65	10'50	Died soon after discharge.
23 F	—	43	—	V A	8 "	Considerable softening in one lung.	11	7	14'25	Moderate. See No. 81 A. T.
24 M	—	112	—	A	12 "	Considerable softening and consolidation.	7	24	23'25	Fairly well, able to work half time. T.
25 M	—	57	—	V A	2½ years	Consolidation and softening in both lungs.	9	16	9'75	Indifferent.
26 M	—	40	—	A	2½ years	Consolidation in both lungs. Abscess.	9	13	9'75	Very well, working 8 hours, supporting family. T.
29 M	—	85	—	V A	6 months	Consolidation in both lungs ..	7	23	24'50	In good health, working 9½ to 14 hours as engineer. T.
31 M	—	213	—	Not found ..	8 "	Consolidation and softening and cavity.	3	61	7'75	Chest condition good.
32 F	—	42	—	No sputum ..	2 years ..	Consolidation and consolidation and cavity.	9	20	19'25	Fairly well and working 9½ hours. T.
33 M	—	150	—	V A	3 " ..	Consolidation and cavity and consolidation and softening.	5	45	10'25	Relapse after overstrain, died shortly after discharge.

34 M	86	—	7 A	..	..	4 months	Consolidation and softening and consolidation.	7	29	9'00	Well and working 9½ hours as engineer. T.
38 M	87	—	7 A	..	..	2 years ..	Consolidation and softening in both lungs.	7	32	3'50	Not good.
39 M	97	—	A ..	..	..	5 "	Consolidation and softening and consolidation.	6	40	25'50	Well and working 9 hours, supporting family. T.
41 F	120	—	Not found	..	..	4 months	Consolidation in both lungs ..	5	48	20'75	Very good, working all day in service. T.
42 M	77	—	P ..	..	..	9 "	Consolidation in both lungs ..	6	38	21'00	Very good, working full time. T.
43 M	83	—	Not found	..	..	8 years ..	Extensive bilateral disease ..	6	41	13'50	Died soon after discharge, unable to maintain treatment.
44 F	63	—	Not found	..	..	8 "	Consolidation and consolidation and softening.	7	35	5'75	Not good, unable to maintain treatment.
47 F	71	—	A ..	..	..	3 months	Consolidation and softening in both lungs.	6	42	16'25	Practically stationary.
48 M	86	—	7 A	..	..	2 "	Consolidation in both lungs ..	5	49	18'50	Good, working full time. T.
49 M	112	—	A ..	..	..	6 "	Consolidation and cavities in both lungs.	4	56	20'75	Good, not working yet. T.
50 M	29	—	Not found	..	..	2 years ..	Consolidation and softening in both lungs.	7	33	9'00	Was well when last heard of.
51 M	106	—	7 A	..	..	4 months	Consolidation and softening and consolidation.	4	54	18'50	Fairly good, working 7 hours. T.
51 A 14 M	217	—	See No. 14	..	..	See 14	Extensive bilateral disease ..	4	79	—	Stationary. See No. 14. T.
53 F	18	—	A ..	..	..	2 years ..	Extensive bilateral disease ..	7	34	4'75	Not well.
54 M	86	—	7 A	..	..	3 months	Cavities in both lungs ..	4	55	19'00	Very well, working 9½ hours as engineer. T.
56 M	141	—	P ..	..	..	4 years ..	Consolidation and softening and consolidation.	2	69	14'25	Very good, working 9 hours per day. T.
57 F	183	—	7 A	..	..	18 months	Consolidation in both lungs ..	4	81	7'50	Recently discharged greatly improved. T.
59 M	57	—	7 A	..	..	4 years	Consolidation and consolidation and softening.	5	53	16'00	Fairly well, has gone abroad. T.
60 F	113	—	Not found	..	..	3 months	Consolidation and softening in one lung.	2	66	23'75	Good, doing light work. T.
64 M	118	—	A ..	..	..	3 "	Consolidation in both lungs ..	2	72	36'00	Good, working 9½ per day. T.
66 F	71	—	7 A	..	..	6 years	Consolidation and cavity and consolidation.	3	80	14'25	Good. T.
67 M	168*	—	7 A	..	..	2 "	Consolidation and softening in both lungs.	Still in	—	—	—
69 M	99	—	7 A	..	..	18 months	Consolidation and softening and consolidation.	2	70	12'50	Moderate, unable to work. T.
70 F	92	—	No sputum	..	..	10 "	Consolidation and softening in both lungs.	2	71	20'00	Good, able to do light work. T.

CLASS II.—DISEASE MORE EXTENSIVE—continued.

Age and Sex.	Days in Sanatorium before 1906.	Days in Sanatorium in 1906.	Gain in lbs. to December 31st, 1906.	On Admission.			Months since discharge.	Case No.	Total Gain in lbs.	T—Maintaining the Treatment.
				Tubercle Bacilli Present. A Abundant. P A very abundant.	Duration of Disease given.	State.				
71 F	—	83	—	No sputum	6 months.	Consolidation in both lungs	3	67	22.25	Good, doing light work. T.
72 M	—	84	—	P A	10 "	Consolidation in both lungs	2	68	—	Fairly good, working 8 hours. T.
74 F	—	140	—	Not found	1 "	Consolidation and softening in one lung.	4	82	15.75	Recently discharged, condition satisfactory. T.
76 F	—	124*	16.00	P A	9 "	Consolidation and softening in both lungs.	Still in	—	—	—
77 M	—	113*	6.25	P A	6 "	Consolidation and softening and cavity.	Still in	—	—	—
78 M	—	110*	6.50	P	15 "	Consolidation and consolidation and softening.	Still in	—	—	—
79 M	—	85	—	Not found	10 "	Cavities in both lungs	4	80	—	Recently discharged, good improvement. T.
81 A 23 F	—	43	—	A	See 23 "	Consolidation and consolidation and softening.	2	75	10.00	Fairly well, not working yet. T.
82 M	—	76	—	P	24 years	Consolidation and softening in both lungs.	4	84	8.5	Recently discharged. T.
83 M	—	74*	22.00	P	10 months	Consolidation in both lungs	Still in	—	12.75	—
85 M	—	68*	13.00	P	3 years	Widespread tubercle	Still in	—	—	—
86 M	—	68*	8.25	A	44 "	Consolidation and softening in both lungs.	Still in	—	—	—
87 M	—	39	—	Not found	15 months	Consolidation and cavity	1	77	—	Recently discharged.
89 M	—	57*	7.5	A	3 years	Consolidation and softening in both lungs.	Still in	—	—	—
92 M	—	20	.75	A	2 "	Consolidation and softening and consolidation.	Still in	—	—	—
92 A 13 F	—	12*	4.00	Not found	See 13	Consolidation and softening and consolidation.	Still in	—	—	—

CLASS III.—DISEASE SERIOUSLY COMPLICATED.

	75	17		V A		10 months		Consolidation and softening. Kidney disease. Extensive tubercle. Asthma silicosis.	12	5		
3 F			—	V A	..	15 "	..	Widespread tubercle. Fever ..	Died	—	—	Died soon after leaving. Operation performed.
5 M	50	—	—	V A	..	10 "	..	Complicated by chronic bronchitis and emphysema.	14	2	—	Died in the Sanatorium. Injured by quartz dust.
10 F	7	—	—	P ..	..	2 years ..	..	Early tubercle. Diabetes ..	11	1	—	Died soon after discharge.
12 M	50	44	—	No sputum	..	9 months	..	Very early tubercle. Heart disease.	13	8	23 75	Died recently; overstrained himself and never recovered.
17 F	10	—	—	Not found	..	4 month	..	Extensive disease. Gynaeological.	9	4	3 75	Fairly well, able to do light work. T.
20 F	13	99	—	P ..	..	9 months	..	Extensive disease with cavities. Silicosis.	13	21	27 30	Very well, in service. T.
27 F	—	8	—	Not found	..	11 "	..	Severe laryngeal trouble ..	6	6	3 75	Died a few months after discharge.
30 M	—	126	—	No sputum	..	2 years ..	..	Extensive disease and Graves' disease.	Died	39	—	Died in the Sanatorium. Injured by quartz dust.
37 F	—	135	—	A ..	..	3 "	..	Extensive tubercle and asthma	5	46	41 00	Very good, doing light work.
40 F	—	85	—	Not found	..	18 months	..	Complication of pleuritic effusion.	6	37	23 00	Chest condition satisfactory, considering complication. T.
45 M	—	167	—	No sputum	..	2 "	..	Extensive tubercle. Kidney disease.	3	64	22 75	Fairly well, only able to do light work. T.
46 F	—	29	—	No sputum	..	7 "	..	With spasmodic asthma..	7	28	10 00	Very good, working 11 hours per day. T.
55 F	—	113	—	Not found	..	3 "	..	See No. 12. In temporarily ..	3	63	3 00	Fairly well, but not working yet. T.
58 M	—	57	—	See 12	..	See 12	..	With tubercular disease of intestine.	5	53	18 50	Stationary.
59 A 12 M	—	8	—	Not found	..	10 years ..	..	With hysteria ..	6	43 P	50	See 12.
63 F	—	57	—	Not found	..	3 "	..	Extensive tubercle. Heart disease.	4	57	16 00	Died shortly after discharge, unable to continue treatment. T.
66 F	—	29	—	P ..	..	4 "	..	With tubercular disease of intestine.	5	51	6 25	Improvement maintained. T.
68 M	—	71	—	No sputum	..	8 months	..	Complicated with asthma ..	3	63	17 50	Only slight improvement. T.
73 F	—	92	—	Not found	..	1 year ..	..	See No. 40 ..	2	73	30 50	Excellent, working 6 hours at light work. T.
76 M	—	141	—	Not found	..	See 12	..	Extensive tubercle of lung and intestine.	4	59	5 50	Moderately believed to be working now. T.
76 A 40 F	—	92	—	A ..	..	8 months	..		1	78	—	Recently discharged greatly improved. T.
80 M	—	5	—		..		..		Died	74	—	Died in the Sanatorium.

THE DEVON AND CORNWALL SANATORIUM FOR CONSUMPTIVES.

(Opened May 13, 1903.)

This sanatorium, which is situated on a very picturesque site of 67 acres at Didworthy, some two miles north of Brent, was opened in the spring of 1903 by the Right Honourable the Earl of Mount Edgumbe. The necessary funds were procured largely through the efforts of Dr. R. Hogarth Clay, Chairman of the Institution. The sanatorium consists of a country residence modified to suit the needs of the tuberculous sick, of a house for the Medical Superintendent, and of a new wing for 20 patients. In all it provides for 35 beds. The total cost of the institution, exclusive of the Medical Superintendent's house, was, in the first instance, £7,400, including alterations to house and estate charges, *i.e.*, £370 per bed; but owing to the erection of the new wing already referred to, which was completed inclusive of warming, lighting, and furnishing at the very moderate cost of £1,250, the average cost per bed has been only some £247.

The greater portion of the site is let off at a yearly tenancy, there being ample facilities for the exercise of the patients in the sparsely populated country surrounding the site. The view from the front of the sanatorium is a remarkably pleasant one, with the river Avon winding through the lower part of the grounds.

The Medical Superintendent's bungalow, which is erected on the higher portion of the site, is constructed of wood, and "wire wove," there being a verandah on two sides of the building. The total cost of this structure was some £550, exclusive of furniture.

This bungalow, which is in telephonic communication with the sanatorium, while affording accommodation for the Medical Superintendent provides also two rooms for the accommodation of selected patients who are able to pay three guineas weekly; a sum which allows sufficient margin for the help of patients in the sanatorium proper.

The cubic space allotted to each patient in the sanatorium is about 900 feet.

Water is procured from a spring near the sanatorium, lighting is by means of electricity generated on the site, and warming by means of hot water pipes. As regards the electric light it is hoped shortly to utilise the water of the river Avon as it passes through the grounds, by erecting a turbine for supplying the necessary motive force.

Sewage is disposed of by irrigation on the site.

The total cost of maintenance has, up to the present, been about £2 per week per patient, but it is hoped that when the



DEVON AND CORNWALL SANATORIUM—WEST FRONT.

(To face page 366.)



THE DEVON AND CORNWALL SANATORIUM.

(To follow plate facing page 366.)

institution is quite full that the cost will fall below 30s. per week. The sole use of a bed may be obtained on the following terms :—

	£	s.	d.
For one year... ..	75	0	0
„ six months	40	0	0
„ three „	20	0	0
Every week or fractional part of a week beyond any of the above- mentioned periods	1	11	6

The Conditions of Admission are as follows :—

Only those persons shall be eligible for admission as patients who—

- (a) satisfy the Committee that they are unable to pay for treatment in a private institution,
- (b) and are certified by a member of the Medical Advisory Committee, or by the Resident Medical Superintendent, to be in such a state of consumption as to afford reasonable expectation of permanent improvement or cure.

Patients are expected to remain in the institution for a minimum period of three months.

Patients are admitted—

- (a) In pursuance of contracts made with any sanitary or other authority, or any person or body of persons.
- (b) By tickets of recommendation.

The institution is supported by voluntary contributions, and the following authorities contract for the use of beds annually :—

	Per annum.
	£
Plymouth Corporation	(two beds) 150
East Stonehouse Urban District Council	(one bed) 75
Truro Rural District Council	(one bed) 75
St. Gernans Guardians	(one bed) 75
Plymouth Board of Guardians	(two beds) 150
Devonport „ „ „	(one bed) 75
St. Thomas's „ „ „	(one bed) 75
St. Austell „ „ „	(two beds) 150

Other bodies have sent in patients from time to time but have not made an annual subscription.

Immediate Results of the first four years' work.

During 1903-4 47, during 1904-5 49, during 1905-6 57 (exclusive of 10 educational patients), and during 1906-7 80 (exclu-

sive of 14 educational patients), patients were sent out from the institution, and the results, year by year, were as follows :—

—	1903-4.	1904-5.	1905-6.	1906-7.
* "Cured"	10	8	8	3
* "Relative cures"	19	18	27	29
"Improved" or "Much Improved" ...	8	18	18	34
Not improved or worse	—	2	3	12
Died in sanatorium or shortly afterwards.	3	—	1	1
Dismissed	2	1	—	1
Refused treatment	2	1	—	—
Sent home as hopeless	3	1	—	—
Totals	47	49	57	80

* "Cured" implies that the patient exhibits no physical signs or symptoms of consumption, has no expectoration or elevation of temperature; has gained weight well and is in good general condition. "Relative cure" includes cases which may still present some signs of the disease and have some expectoration, but which are otherwise in good health and fit for work.

Relation of Cure to Stage of the Disease.

Of the 47 cases treated, 1903-4—

24 had consolidation	{ 9 cures. 6 relative cures. 4 improved. 3 died. 2 dismissed.
23 had cavities	{ 1 cure. 13 relative cures. 4 improved. 2 refused treatment. 3 sent home as hopeless.

Of cases treated, 1904-5.		1905-6.		1906-7.	
Stage 1.— Disease only in one lobe or slightly in two.	15 { 8 cures. 6 relative cures. 1 refused treatment.	17 { 8 cures. 8 relative cures. 1 much im- proved.	16 { 3 cures. 10 relative cures. 3 much im- proved.		
Stage 2.— Disease in whole of two lobes.	10 { 0 cures. 8 relative cures. 1 improved. 1 dismissed.	24 { 0 cures. 14 relative cures. 9 much im- proved. 1 worse.	44 { 0 cures. 15 relative cures. 21 improved or much im- proved. 7 worse. 1 dismissed.		
Stage 3.— Disease in more than two lobes.	24 { 0 cures. 4 relative cures. 18 improved. 2 worse.	16 { 0 cures. 5 relative cures. 8 improved. 2 worse. 1 died.	20 { 0 cures. 4 relative cures. 10 improved or much im- proved. 5 worse. 1 died.		

Educational Cases.

Of the 67 cases discharged in 1905-6, ten were admitted for an educational course of a month's duration: There were 14 educational cases dealt with in 1906-7. The results as regards the condition of the patients on discharge were as follows:—

	1905-6.	1906-7.
Much improved or improved	4	4
Worse	6	10
	<hr/> 10	<hr/> 14

The late Dr. Fleming, the medical superintendent, pointed out that these figures compared very favourably with those obtained at other sanatoria of the same class; but he added that far too many old chronic cases were sent in notwithstanding the fact that every effort had been made to obtain early cases. The average duration of the disease previous to admission was 18 months.

If the rule with regard to early cases had been rigidly adhered to the sanatorium would, the Medical Superintendent considered, easily have justified itself on purely economic grounds by returning a large number of patients to the ranks of the workers.

There were, too, difficulties he stated in the necessity for the return of the patients to their former surroundings, and by way of meeting these difficulties he suggested the establishment of a colony where the patients, on their discharge from the sanatorium, would be able to follow a healthy occupation while still remaining under observation.

In the annual report for 1906-7 the Committee of Management state:

Your Committee regret that most of the applicants for admission have on examination been found to be in such an advanced stage of consumption that small hope could be held out to them that they would be permanently improved or cured by a course of treatment at the sanatorium, especially as the usual course is short, only three months.

Duration of Stay.

The average duration of stay was, during the first year, roughly four months, and the Medical Superintendent expressed in the first annual report his opinion that many more "cures" could have been accomplished if it had been possible to detain the "relative cures" for a longer period in the sanatorium.

After Results.

The following tables have been compiled from the figures contained in the annual reports of the late Dr. Fleming, the

Medical Superintendent, and they refer to the ascertained condition of the patients in July, 1905.

Early cases = patients with the disease in only one lobe or slightly in two lobes.

Advanced cases = patients with disease in two or more lobes.

Cases discharged 1903-4.

	Total.	Fit for work.	Fit for light work.	Invalid.	Died of Phthisis.	Died of Other Diseases.	Re-admitted.	Not heard of.
Early cases ...	18	10	3	1	—	2	1	1
Advanced cases ...	29	2	4	2	17	1	—	3
Total ...	47	12	7	3	17	3	1	4

Cases discharged 1904-5.

	Total.	Fit for work.	Fit for light work.	Invalid.	Died of Phthisis.	Died of Other Diseases.	Re-admitted.	Not heard of.
Early cases ...	15	10	2	—	—	1	—	2
Advanced cases ...	34	4	5	7	15	2	—	1
Total ...	49	14	7	7	15	3	—	3

Commenting upon these figures, the Medical Superintendent remarked :—

“The figures of after results are by no means good. The chief cause is that the patients delay coming until the disease is far advanced so that even if they can be brought to the stage of relative cure by sanatorium treatment, the strain of returning to their old surroundings is too much for them and they break down again.

“The results point to the importance of the two questions referred to before, the discovery of early cases and the formation of a colony or other means of taking care of patients after leaving.”

Later After Results.

The following table abstracted from Dr. Fleming's report for 1905-6 may be compared with the results shown in the two tables furnished above.

Condition in July, 1906, of patients discharged year by year since 1903 :—

Year.	Totals.	At work.	At light work.	Invalid.	Dead.	Not heard of.
1903-4	48	13	1	1	26	7
1904-5	48	11	5	2	23	7
1905-6	57	29	4	11	9	4
Totals	153	53	10	14	58	18

Dr. Fleming observes as to this table that the results again point to the importance of supplementing sanatorium treatment with some form of after-care. He states that many of the old patients have died whose lives might have been much prolonged if they had been able to remain under suitable conditions for a longer period.

Dr. Fleming suggested elsewhere in his second report that it may be found advisable to put aside a number of beds for purely educational purposes. He thought that a stay of one month would suffice to educate patients on the best means of conducting their lives so as to improve their own condition and to avoid the risk of infecting their neighbours. By this means he pointed out that a much larger number of patients would pass through the sanatorium annually and that there might thereby be a great gain to the general health of the community.

As will have been seen this suggestion was carried into effect in 1905-6 and in 1906-7.

Owing to the advanced nature of the cases generally it had not been found practicable in the past to devise any comprehensive scheme whereby patients might be encouraged to work or to learn means by which they might on discharge obtain a livelihood by work other than that in the pursuit of which they developed their illness.

During 1905-6, however, patients were given light work to perform when they were regarded as fit for such a task.

Similarly, it has not so far been found feasible to organise any system of after-care, although I am told that in some instances the boards of guardians sending patients to the institution make a small allowance to the patients after leaving the sanatorium.

I am indebted to Dr. Penn Milton, the former Medical Superintendent, for the plates which illustrate the sanatorium, to the late Dr. Julian Fleming for much assistance in compiling this account, and to Dr. A. H. Wylie, the present Medical Superintendent.

MILDMAY HOME FOR ADVANCED CONSUMPTION, TORQUAY.

(Founded December, 1886.)

This institution, which is entirely dependent upon voluntary contributions, is situated at "Smyrna," Bronshill Road, Torquay. It is intended for ten female patients who by reason of the advanced stage of their pulmonary tuberculosis are all ineligible for admission into other non-pauper institutions.

The Mildmay Home is kept open throughout the year, and there is no limit, subject to the weekly payments being maintained, to the length of the patients' residence. But all patients are examined every six months by the medical staff, and those whose condition is so far improved as to render them no longer suitable subjects for the charity are discharged. The weekly payment is for "nominated" patients 7s., for others 10s. 6d. The accommodation provided is altogether insufficient to meet the demands made upon it, and locally a "Home for Chronic Cases" is urgently desired.

Of the patients in this institution at the date of the annual report for 1905, one had been an inmate for three years, and others for periods varying from two or three to 20 months; a large number of cases had recently been refused admission. Dr. F. D. Crowdy and Mr. Hugh P. Wiggan, the Honorary Medical Officers, reported that during 1905, of the eight patients who had left the Mildmay Home, six had made most satisfactory progress towards regaining their health.

I am indebted to Miss Gumbleton, the Honorary Secretary, for the above information.

WESTERN HOSPITAL, TORQUAY.

For the Treatment of Consumption in its Early Stages.

(Founded 1850.)

This hospital, which is situated in an elevated position at Torquay, was founded through the generosity of Miss Gore (afterwards the Hon. Mrs. Powys Keck), with the object of affording opportunities to the working classes of passing the winter months in a favourable climate.

The Institution opens yearly on October 1st and closes on June 1st.

The total accommodation provided is for 40 patients, 20 of each sex; a laundry and isolation ward have recently been added to the buildings. Only such patients are admissible as are regarded by the medical staff as likely to derive

permanent benefit from a stay in the Institution. In their Annual Report for 1903-4 the honorary medical staff call attention—

to the very unsatisfactory way in which the medical certificates are filled in. That 17 patients should have been found to be incurable and obliged to be sent home is sufficient to show that the fact that the Western Hospital is for cases of incipient consumption only is by no means understood by the medical men who send such patients to the Institution; and the honorary medical staff sincerely hope that more care in this respect may be exercised in the future.

Better results have, however, been recently obtained by adoption of a new form of medical certificate; more suitable cases are now being sent in.

During 1905-6 the disease is reported to have been arrested in 18 cases; 17 patients were regarded as very much improved, 15 as much improved, 22 as improved, and 11 as unaltered; and 1 died.

The cost of maintenance varies somewhat from year to year. In 1905-6 such cost was 16*s.* 9*d.* weekly per case, and towards this amount each patient furnished with a nomination pays 7*s.* 6*d.*, without nomination 12*s.* 6*d.*

Nominations are obtained from subscribers, each nomination being available for four months' treatment, an additional letter being necessary if in the opinion of the medical staff further treatment is desirable.

THE DURHAM COUNTY SANATORIUM.

(Opened May, 1901.)

This institution, which was founded under the auspices of the Durham branch of the National Society for the Prevention of Consumption, is situated just outside the village of Stanhope, in the Wear valley.

Dr. John Gray, the medical officer, was good enough to show me the institution and to furnish me with the photograph herewith reproduced. I am also much indebted to Dr. Robinson, of Sunderland, who is chairman of the general committee, and with whose name the institution is intimately associated.

The site, which has attractive surroundings, consists of two and a half acres of land at an elevation of some 200 feet above ordnance datum, the neighbourhood being well suited for the exercise of patients. The grounds proper are well protected, both naturally and by means of a high wall which encircles them, but the patients are not confined to the grounds.

The main building consists of a country house, held on an 80 years' lease at £35 rental, and altered in such fashion as to serve the needs of an open-air sanatorium. This building has now been so extended and enlarged as to provide in all 45 beds, *i.e.*, 27 for males, and 18 for females, and an appeal is now being made for the establishment of a separate sanatorium for women and children. There are numerous shelters in the grounds as also *liegehallen*.

Lighting is by gas, warming by hot water radiators, and sewage disposal by septic tank and bacterial beds.

The sanatorium is supported by the payments of patients, by subscriptions from local authorities, from industrial authorities and groups of workmen, as also by voluntary subscriptions, and the following tables will serve to show the income and expenditure for the last three years.

The *Ordinary Income* for the past three years has been as follows :—

—	1904-5.	1905-6.	1906-7.
	£ s. d.	£ s. d.	£ s. d.
Annual subscriptions ...	191 0 0	200 6 6	196 7 0
Workmen's subscriptions ...	400 4 9	654 14 0	761 9 0
Interest on investments ...	64 17 10	62 17 0	98 8 1
Payments by patients ...	1,251 15 3	975 16 4	1,071 10 7
From local authorities ...	629 0 0	1,162 15 0	1,223 7 0
Sundry Receipts ...	17 0 0	24 17 9	11 7 0
Total ...	2,553 17 10	3,031 6 7	3,362 8 8

The *Ordinary Expenditure* for the past four years has been as under :—

—	1903-4.	1904-5.	1905-6.	1906-7.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Provisions ...	885 19 11	1,032 11 4	1,247 10 2	1,055 5 11
Salaries and wages	458 4 0	510 3 5	593 19 4	601 13 6
Rent, rates, coals, and gas.	117 2 4	128 9 0	179 17 0	161 2 4
Repairs and renewals	64 12 9	266 2 0	149 15 11	91 9 5
New shelters and walks.	117 6 9	69 7 6	7 0 11	5 9 4
Medical requisites...	9 17 10	11 10 5	3 4 1	7 0 1
Printing and general expenses.	58 9 2	65 9 11	79 16 0	57 9 11
Expenses of meetings and lectures.	—	—	—	16 2 4
Total ...	1,711 12 9	2,083 13 7	2,264 3 5	1,995 12 10



THE DURHAM SANATORIUM.

(To face page 374.)

The average number, cost, and stay of each patient for the last seven years is shown below :—

—				Average daily number of patients.	Cost of each patient per week.	Average stay in Sanatorium.
					£ s. d.	Weeks.
1906-7	...	...		43.4	0 17 10	13.2
1905-6	...	...		41.1	1 1 6	14.8
1904-5	...	...		32	1 5 0½	14.7
1903-4	...	...		29.2	1 4 9	14.5
1902-3	...	...		25.7	1 4 4	15.3
1901-2	...	...		16	1 9 8	15
1900-1	...	...		11	1 10 8	12.4

The total cost of stimulants during 1905 was £5 13s. 6d., and during 1906 £4 7s. 9d.

During 1906-7 the following local authorities supported the institution by maintaining beds for their sole use :—

—					Beds.	Annual subscription.
Borough of	Sunderland	...	...	...	2	150
"	Gateshead	...	...	...	2	150
"	Jarrow	...	...	...	1	75

And the following authorities sent in patients :—

Chester-le-Street Rural District Council.

Easington

South Shields

Guardians of Darlington Union.

" Durham

" Gateshead

" Lanchester

" Middlesbrough

" Bradford

" South Shields

" Teesdale

" Tynemouth

Results.

The General Committee point out in their 5th Annual Report that while nearly every patient receives much benefit from the treatment, it is the early cases which receive most permanent good, and who are restored to work for years. The advanced or cavity cases, especially among the poor, if they return to their old unhealthy surroundings and work, often relapse. They add that an out-door colony for discharged patients is therefore much needed for the lower classes.

Summary of Immediate Results for 1906-7.

Nature of case on admission.	Cases discharged.	Apparently cured.	Very much improved.	Improved.	Returned to work.
		per cent.	per cent.	per cent.	per cent.
Consolidation (or early) cases.	101	23 or 22·7	62 or 61·3	9 or 8·9	70 or 69·3
Cavity or advanced cases.	52	1 or 1·9	30 or 57·6	14 or 26·9	17 or 32·6
Totals ...	153	24 or 15·6	92 or 60·1	23 or 15·0	87 or 56·8

Tubercle bacilli were found in all the "consolidation" cases except in the 23 who left apparently cured. Amongst the "cavity" cases only one showed negative signs as regards tubercle bacilli on discharge.

Lasting Results of the Treatment.

The following table shows the results of the first seven years' work in so far as it could be gauged up to April 30th, 1907, but it is important to note in so far as comparison with the figures of other sanatoria is concerned that the statistics furnished below do not include cases which remained in the institution for less than three weeks or who died within the same period.

Summary of Results of first seven years.

(1) Early or Consolidation Cases.

Year.	Cases Discharged after Treatment.	Returned to Work.	Condition on April 30th, 1907.				
			At Work.	At Home.	Dead.	Lost sight of.	Percentage of total cases discharged at work on April 30th, 1907.
1900-1901...	16	14	6	—	4	6	37·5
1901-1902...	30	23	11	1	9	9	36·7
1902-1903...	41	30	10	3	20	8	24·4
1903-1904...	59	46	29	4	11	15	49·2
1904-1905...	75	57	31	4	21	19	41·3
1905-1906...	84	63	44	8	19	13	52·5
1906-1907...	101	70	66	27	8	—	65·3
Total...	406	303	197	47	92	70	48·5

(2) Advanced or Cavity Cases.

Year.	Cases Discharged after Treatment.	Returned to Work.	Condition on April 30th, 1907.				
			At Work.	At Home.	Dead.	Lost sight of.	Percentage of total cases discharged at work on April 30th, 1907.
1900-1901...	20	9	0	1	17	2	Nil
1901-1902...	25	12	1	—	19	5	4
1902-1903...	38	23	5	—	24	9	13·2
1903-1904...	39	16	1	5	24	9	2·6
1904-1905...	37	14	3	5	20	9	8·1
1905-1906...	57	23	15	4	23	15	26·3
1906-1907...	52	17	16	19	17	—	30·7
Total...	268	114	41	34	144	49	15·3

As regards the progress made by subscribing workmen the following report is instructive :—

YEARLY REPORT.

As to Patients sent by Subscribing Workmen.

During the year ended April 30th, 1907, 7½ beds have been continuously occupied by patients sent by subscribing workmen. Thirty-eight patients in all, sent by subscribing workmen have been under treatment. Of this number *nine* were still inmates of the Sanatorium on April 30th.

The amount of the workmen's subscriptions for the year was £761 9s. 0d., an increase of £108 6s. 10d. over last year.

Of the twenty-nine discharged, twenty-one were men and eight women. Four were discharged apparently cured, fifteen, very much improved, five improved, and five unsuitable.

These results would have been much better had it not been that the great majority of the patients admitted were advanced cases.

The Committee therefore desire to impress upon all the Subscribers the supreme importance of sending cases of consumption to the Sanatorium directly the disease is recognised, as the hopes of cure or lasting benefit are much greater when the treatment is undertaken at an early stage of the disease.

The Committee also wish patients and their relatives to understand that, in order to maintain the improvement in health obtained at the Sanatorium it is necessary that the patients should continue the treatment at home and obtain such employment as will enable them to pass their working hours in pure air—preferably an out of door occupation in the country.

Note—Workmen subscribers, their wives, and children over 15 years of age depending on them, are entitled to *Free Admission* to the Sanatorium, and take precedence over other cases in the order of admission.

(Signed) JAMES C. SCOTT,
Chairman of the Workmen's Governors.

Except for the fact that the numbers vary from year to year the wording of this notice has been practically identical for each of the years during which the institution has been open. The importance of selecting early cases has always been accentuated.

Extracts from Annual Reports.

For year ending 1901 (Medical Officer's report) :—

The general condition of all the patients was improved during their residence and this improvement was quite as marked during the winter months as at any other time.

These results, which show that 63 per cent. of all the patients discharged have returned to work, are very satisfactory, but point most particularly to the uselessness of attempting the cure of patients *in an advanced stage of the disease* in a few months. The patient comes in buoyed up with the hope of cure, and no doubt his general condition is much improved ; but the lung condition of improvement only remains so long as the patient continues to live in his improved hygienic surroundings. But a time comes when the patient is compelled to leave to make room for some more pressing case, when probably the shock of his disillusionment is the starting point of a relapse which undoubtedly ends in his early death.

Compare this with the results in the *earlier* cases, where no less than 87.5 per cent. were sufficiently improved to resume their employment, and where one can reasonably hope the improved lung conditions will be lasting if the patient can only live and work in healthy surroundings.

Some system of an agricultural colony, where patients could do so much work (farm or gardening), would seem desirable. Here patients would have the guarantee of pure air free from chemical and other pollution, sufficient sleeping accommodation, and an ample supply of good food free from disease germs.

For year ending 1902 (Medical Officer's report) :—

If the necessity for such an early return to the patient's old mode of life could be obviated by a less speedy return to the old work, or by starting work more suited to his condition, it stands to reason that the chances of his remaining in the ranks of "workers" with the further chance of, perhaps, permanent cure, would be much greater. It will be seen below that only 30 per cent. of the *advanced* cases treated during the first year are still at work. Hence the need of some colony, particularly for the advanced cases, seems more necessary than ever if this class of case is still to be admitted to the sanatorium, where only a comparatively short period (owing to the great number awaiting admission) is available for their treatment.

For year ending 1905 (Report of Committee) :—

Many of the advanced cases soon relapse on returning to their old surroundings. A working out-door colony is much needed to consolidate the cure in these and other cases.

For year ending 1906 (Report of Committee) :—

A working out-door colony would be of great help in consolidating the cure in most cases.

Report of Medical Officer for same period :—

Speaking generally the class of case under treatment has not been so good as in previous years. Considering the increasing number of cases showing extensive disease I beg to point out that on the average the period of absolute rest required to reduce the physical signs of the disease and diminish the temperature is much longer, and that therefore a longer period of treatment than four months is required to produce a more permanent arrest of the disease in the majority of cases admitted for treatment.

Report of Medical Officer for 1907 :—

Injection of Koch's Tuberculin T.R. was practised on a few suitable cases. The method was to inject 1/1000 milligramme once a fortnight. The number of injections varied from one to four in the different cases. No advantage seemed to be gained, as only those cases in which a favourable prognosis could be given with the ordinary treatment could be selected for injection, and even in these the results were uncertain and disappointing. Latterly, in addition, Dr. Sewell kindly estimated from time to time the opsonic indices of patients so treated in order to avoid re-injecting before the reaction had taken place.

Additional testimony as to Work of Sanatorium.

Extracts from Annual Report of Medical Officer of Health of Sunderland for 1905.

Report of Corporation cases sent to the Stanhope Sanatorium :—

Since June, 1901, 50 patients have been treated in the Stanhope Sanatorium as Corporation patients :—

4 of these are still in the sanatorium.

26 are dead.

17 are well.

1 is ill.

2 cannot be traced (one of these cases went to Canada).

Of those who died the average duration of life after discharge was two years.

Of the 17 who are in health :—

2 have been out 4½ years.

2 have been out 4 years.

1 has been out 3½ years.

1 has been out 3 years.

2 have been out 2½ years.

1 has been out 1½ years.

2 have been out 1½ years.

2 have been out 1 year.

4 under 1 year.

The report continues :—

For the open-air treatment of consumption to be successful, and by that I mean that the disease should be arrested permanently, two things are essential.

The first is that only suitable cases in the early stage of the disease should be admitted.

The second is that after the process has been arrested by open-air treatment the patient should not return to his former environment but should obtain some form of employment altogether in fresh air, such as farming. To go back to the old surroundings, in my opinion, means that sooner or later the disease will return—not in all cases, for I know that many have not relapsed, but in the majority I am afraid this

is so. My medical confrères are aware of this and they cannot be too particular in obtaining a specimen of the expectoration as soon as possible and having it examined for tubercular bacilli. The records of cases which have received open-air treatment at an early stage are very gratifying. The majority of these cases in which the disease is arrested would not again become infected if they could live under suitable conditions but, unfortunately, so many have to go back to unfavourable localities. What is wanted is some national movement to provide farm colonies for these cases.

COPPINS GREEN SANATORIUM AND MARKET GARDEN.

(Opened 1906.)

The foundation of this institution is due to the work of Dr. J. E. Chapman, who has for many years devoted attention to several of the economical aspects of the sanatorium problem. He has recently endeavoured to demonstrate the practicability of establishing sanatoria for the poorer classes without great capital or initial expenditure, and of maintaining patients therein at a relatively small weekly cost.

With this end in view he has acquired on a long lease, and with an option of purchase, an institution originally constructed as a holiday home for boys. This building consisted of a brick structure embodying in the main two large wards or dormitories, and by introducing a large number of casement windows and erecting certain necessary partitions, Dr. Chapman has been able to convert the building into a sanatorium for 20 male patients.

The institution is situated in Essex at a distance of about $1\frac{1}{2}$ miles from Clacton-on-Sea, from which place the sanatorium is easily reached.

In connection with the institution there are 20 acres of agricultural land which, as means and opportunities allow, is being gradually converted into a market garden to be worked by the patients, arrangements having been made by which patients who have recovered their working power but whose disease has not yet been fully arrested may continue to work while being paid for the labour performed.

Dr. Chapman points out in a statement relative to his institution that the process of arrest of tuberculosis takes a considerable time to complete, and that a patient with even a very limited amount of disease requires at least three months' treatment, patients whose disease has passed this quite initial stage requiring naturally longer treatment..

By the scheme devised by Dr. Chapman, all patients directly they are able to do work on a very limited scale may do so while at the same time being kept under medical supervision, and

being paid according to the amount of work which they are capable of performing without risk to their health. The money thus earned by the patients is deducted from the weekly payments made by them to the sanatorium. During this time, too, the patients are being taught the elements of market gardening, and thus are furnishing themselves with the means by which they may subsequently obtain a livelihood.

There is, moreover, a limited amount of accommodation at the sanatorium whereby such patients who are sufficiently well to look after themselves may find employment in the garden, and by their labours render themselves almost entirely self-supporting. It is clear that this scheme offers to single men who can devote the necessary time to the treatment, an opportunity of pursuing, while under general medical supervision, a healthy vocation until their disease is thoroughly arrested and they are able to obtain employment elsewhere.

This sanatorium is not conducted for a profit, but it is necessary that the institution should be self-supporting. The usual payment is 25s. per week, but a number of selected convalescent patients who have been working in the garden are, when their physical condition allows of it and they desire to remain longer at the sanatorium, offered the option of continuing treatment at an inclusive fee of 13s. 4d. per week, the wages earned being applied to a reduction of the weekly payments to the institution.

Dr. Chapman has been good enough to furnish me with the following statement relative to this institution :—

Summary of Accounts for 1st six months.

	£	s.	d.		£	s.	d.
Fees received ...	339	1	3	By Food...	174	18	8
				Cleaning ...	5	17	1
				Fuel ...	7	7	0
				Lighting ...	1	16	5
				Laundry ...	24	19	10
				Drugs (including stock).	10	7	0
				Office (including stock).	18	12	3
				Salaries and Wages	34	1	10
				Rent...	25	8	0
				Rates and Insurance	8	14	0
				Repairs ...	3	3	1
				Balance ...	23	16	1
	339	1	3		339	1	3

Nothing is allowed in the above for medical supervision, for which £150 would be required. The above accounts being those of the first six months' working, during the earlier part of which time the sanatorium was not full, only serve as an indication that

the expenses of working will be within the estimate, viz., 25s. per week for 15 patients, and 13s. 4d. for 5 patients.

The capital cost of such a sanatorium is very difficult to ascertain accurately, as in this instance an existing building was adapted, and a large amount of furniture was given. It may, however, be valued fairly closely at £80 per bed exclusive of site.

The cost of the dietary for patients and staff, excluding patients on invalid dietaries, works out between 7s. and 7s. 6d. per week.

Invalid dietaries cost approximately 10s. per head per week.

The average nutritive value of the dietary is approximately, proteid, 150 ; fat, 130 ; carbohydrate, 450 grammes.

The market garden is worked independently of the sanatorium, and this being the first year it cannot be expected to pay its expenses. The prospects, however, are good. Three men (patients) are continually employed, and in busy times as many as eight have found work in the gardens. The men are paid according to the value of the work done so far as possible. Two of the above patients are self-supporting, and several others are almost so ; they are thus enabled to continue treatment for a long time at little or no cost to themselves. The work is in an experimental stage at present, but the indications at present are satisfactory.

Application for admission into this sanatorium should be made to the Medical Superintendent, Coppins Green Sanatorium, Clacton-on-Sea, Essex.

BIRMINGHAM MUNICIPAL SANATORIUM.

(Site acquired, 1907.)

The Town Council of Birmingham has recently, acting on the advice of Dr. Robertson, the Medical Officer of Health, acquired an extensive site on Leckhampton Hill, near Cheltenham, whereon to erect a sanatorium for the treatment of early cases of pulmonary tuberculosis.

This site, which was acquired after public inquiry by the Local Government Board, entailed an expenditure of £17,000. Although the area of the site, nearly 400 acres, was much in excess of the needs of the Corporation, it was found impossible to secure part only of such site, and, consequently, in order to procure the mansion, which it is proposed to convert into an administrative block, and the necessary site for the new sanatorium buildings the whole estate had to be secured. The

greater portion of this area will, however, remain on lease for agricultural purposes, some 57 acres of land, together with the mansion, being alone utilised for sanatorium purposes. The patients will, however, have the right to take exercise over the paths which traverse the estate in various directions.

This sanatorium is the first institution of this nature actually promoted by an English municipality. (See Chapter VIII., Part I.)

THE FIRS HOME, BOURNEMOUTH.

(Founded 1868.)

This institution, which comprises accommodation for 20 patients, is intended for a home (1) for advanced cases of chest disease which require removal from any of the institutions of Bournemouth devoted solely to the care of early cases, preference in all instances being given to the patients from the National Sanatorium at Bournemouth; (2) for advanced cases of chest disease if resident in Bournemouth at least one month; (3) for approved cases not justified under (2), but who are able to pay an entrance fee of two guineas.

The weekly charge in all cases is 10s. 6d. inclusive.

If patients undergo improvement and thus become ineligible for the institution a month's notice is given to them.

Applications for admission are made to the Lady Superintendent, Miss Maguire, The Firs Home, Trinity Road, Bournemouth.

THE HAHNEMANN CONVALESCENT HOME, BOURNEMOUTH.

(Founded 1879.)

This institution, which is situated in its own grounds on the West Cliff, Bournemouth, receives patients from homœopathic and other hospitals and dispensaries in Bournemouth and elsewhere. The Home arose out of the homœopathic dispensary which was founded in Bournemouth in 1868.

A three-storied building provides accommodation for 32 patients, there being 16 beds for males, 15 for females, and one for specially urgent cases. On the first and second floors are spacious balconies for the accommodation of patients (the great majority) who are suffering from pulmonary tuberculosis.

The weekly charges per case are 21*s.* without a nomination and 7*s.* 6*d.* with a nomination.

Out of a total of 195 in-patients treated during 1905, no fewer than 174 were suffering from pulmonary tuberculosis. The results of treatment of the 174 are recorded as follows :—

Total.	Cured.*	Much Improved.	Improved.	Unimproved.	Discharged as Unsuitable.	Remaining at the Home.
174	6	95	35	9	8	26

* Cases of phthisis in which it has not been possible to hear the further history of the patient after leaving the institution have not been entered as cured, as some in which apparent cure has taken place doubtless relapse after their return to their previous avocations and surroundings.

As regards the presence of tubercle bacilli, the sputum of 84 patients was examined on admission, the bacilli being found in 64 cases. On discharge bacilli were still discovered in 36 cases.

THE NATIONAL SANATORIUM FOR CONSUMPTION AND DISEASE OF THE CHEST, BOURNEMOUTH.

(Founded 1855.)

This institution was the first of its kind established in this country.

Its object in the terms of the Trust Deed, dated 1855, is "to afford a temporary asylum for patients in humble circumstances afflicted with chest disease who, being convalescent, may yet require further medical treatment and change of air to establish their health ; or who are labouring under such an incipient form of disease as to have reasonable hope of obtaining benefit from a temporary residence in dry and salubrious climate."

The sanatorium is situated on the eastern side of a secluded valley in Bournemouth and is well protected from the east winds. The grounds are wooded and afford scope for exercise, but the patients are, subject to certain restrictions, not solely dependent upon such grounds for exercise, &c.

The building itself, as will be seen by the accompanying plate, is a substantial two storied stone structure affording accommodation (in 1905) for 85 patients, 43 males and 42 females, the former being housed on the ground floor, the latter on the first floor. The accommodation generally has been materially improved within recent years, better provision having been made for the nurses ; the dining rooms having been enlarged, lavatory



THE NATIONAL SANATORIUM FOR CONSUMPTION AND DISEASES OF THE CHEST AT BOURNEMOUTH.

(To face page 384.)



BUNGALOW AND SHELTER ERECTED FOR THE OPEN-AIR TREATMENT OF MALE PATIENTS AT THE BOURNEMOUTH SANATORIUM.

(The provision for female patients is situated in another part of the grounds.)

(To follow plate facing page 384.)

accommodation increased, and the sash windows formerly existing in the dormitories replaced by casement windows and fanlights. The ventilation has also been improved in other respects. The cubic space allotted to each patient is, I am informed by the Secretary, about 1,290 cubic feet.

Every effort has been made for several years to carry out here the open-air treatment, and the grounds around the hospital have enabled the Committee to erect bungalows and shelters for the accommodation of patients.

The institution is closed each year during July and August, and all patients are expected to leave on or before June 30th.

Lighting is by means of electric light, the bungalows and shelters also being lighted by this means.

There are a certain number of free beds at the institution, but the majority of the patients pay 7s. 6d. weekly, a sum which is inclusive of everything save the washing of personal clothing.

Conditions of Admission.

Only males over 17 and females over 16 years of age are admitted.

Each applicant has to secure a governor's nomination and furnish a medical certificate relative to his physical condition. Each nomination is available for twelve weeks, an additional paper being necessary if further treatment is called for.

Some 400 patients were treated in this institution during 1905, and the list of the localities from which the patients come indicates that the work of the sanatorium is thoroughly national in character.

Although endeavour is made to limit admission to early cases, a considerable number of patients are in too advanced a stage of phthisis to secure full benefit from the open-air treatment. Thus, the Committee in their Annual Report for 1902 say :—

"The number of cases unsuitable from their advanced stages again calls for comment from the Committee. In consideration for the patients and their friends, as well as the institution itself, they would direct the special attention of the governors, medical referees, and medical attendants of applicants to this subject in the hope of securing only such cases as are *bond fide* convalescent and likely to gain permanent benefit."

And in their Annual Report for 1904 the Committee, after stating that there was a considerable increase in the number of bed-ridden patients of whom three died in the institution during the year, add that only such cases as are in the early stage of the disease and are likely to gain *permanent* benefit may be sent in, a somewhat similar wish being expressed in the Annual Report for 1905.

The average length of stay in the sanatorium during 1905 was eight weeks four days, and the weekly cost per patient £1 2s. 1d.

Results.

A medical report was issued for each of the years 1901 and 1902, but it does not appear that a detailed medical report has since been published.

The medical report for 1900-01 states in reference to the table therein furnished :—

“The great advantage of early treatment is very evident, showing as it does 63 per cent. of cases of arrested disease in the early stage, 40 per cent. in the intermediate, and only 11 per cent. in the advanced stage, the latter being persons of exceptionally good constitution.”

The report adds that the term “apparent arrest of disease” is used in preference to that of “cured,” sufficient time not having elapsed to warrant the latter expression.

The following is the table to which the above comments relate :—

Condition of Patients on Discharge ; and their Present State, April, 1901.	Early.	Inter-mediate.	Advanced.
Apparent Arrest of Disease on Discharge ..	63 per cent.	40 per cent.	11 per cent.
Present State { Improvement maintained ..	62 “ “	34 “ “	9 “ “
{ Improvement not maintained ..	0 “ “	4 “ “	0 “ “
Improved on Discharge	35 per cent.	44 per cent.	62 per cent.
Present State { Improvement maintained ..	30 “ “	31 “ “	39 “ “
{ Improvement not maintained ..	2 “ “	8 “ “	9 “ “
Not Improved on Discharge	2 per cent.	16 per cent.	24 per cent.
Present State { Improved	0 “ “	4 “ “	0 “ “
{ As on discharge	2 “ “	6 “ “	12 “ “
{ Worse	0 “ “	3 “ “	3 “ “
Died in the Sanatorium	—	—	3 per cent.
Died since leaving the Sanatorium	4 per cent.	10 per cent.	28 per cent.
Average gain in weight	8½ pounds	6½ pounds.	4 pounds

In the Medical Report for the year ending March 31st, 1902, the resident medical officer states that notwithstanding great precautions taken during the year to exclude cases of advanced lung disease, such cases constituted more than half of the whole number of patients who were admitted with pulmonary tuberculosis.

He adds :—

“ Those patients who have shown great improvement in their physical signs have been included with those under the heading of “ apparent arrest of disease on discharge,” but it must be remembered that it is impossible in so short a period as that of one year since discharge to definitely return the disease as cured.

The Annual Report for the year ended March 31st, 1903, contains the following statement :—

“ The number of patients this year affected on admission with early pulmonary tuberculosis shows a considerable falling off compared with those of last year ; while those with advanced disease a lamentable increase.

“ It is unfortunate that the social conditions to which the majority of our patients are obliged to return, and the need of earning their living, prevents them in a great degree from maintaining the improvement which they have made in the sanatorium.”

The following table is contained in the report :—

PATIENTS UNDER FULL “ OPEN-AIR ” TREATMENT.

Condition of Patients on Discharge ; their Present State, 31st March, 1903.	Early stage of disease.		Intermediate stage of disease.		Advanced stage of disease.	
	No. of cases.	No. p. cent.	No. of cases.	No. p. cent.	No. of cases.	No. p. cent.
1. Apparent Arrest of Disease on Discharge	1	100	23	43'39	29	27'35
Present State. { Improvement maintained ..	1	100	23	100	26	89'65
{ Improvement not maintained	—	—	—	—	3	10'34
2. Improved on Discharge	—	—	29	54'71	73	68'86
Present State. { Improvement maintained ..	—	—	26	86'2	68	93'15
{ Improvement not maintained	—	—	2	6'89	5	6'84
{ Died since discharge	—	—	2	6'89	—	—
3. Not Improved on Discharge	—	—	1	1'88	4	3'77
Present State. { Improved	—	—	—	—	2	50
{ As on discharge	—	—	1	100	1	25
{ Worse	—	—	—	—	1	25
4. Died in the Sanatorium	—	—	—	—	—	—
5. Total number of cases under full open-air treatment.	1	0'62	53	33'12	106	66'25
6. Average gain in weight	lbs. 11'5		lbs. 11'63		lbs. 7'73	

As has been said, separate and detailed medical reports have not been issued since March, 1903 ; in subsequent reports of the

Committee medical data have been presented in the form given below :—

From Report of Committee for 1905.							Men.	Women
Disease arrested	...	...	...	...	...	...	27	10
Much improved	...	...	...	...	...	...	85	55
Improved	...	...	...	...	...	...	71	90
No improvement	...	...	...	...	...	...	15	19
Transferred to First Home	...	...	...	...	...	...	4	1
Discharged shortly after admission as unsuitable for treatment or for other reasons.							4	4
Died	...	...	...	...	...	...	3	2
Total							209	181

ST. JOSEPH'S HOME, BOURNEMOUTH.

This is a purely philanthropic institution situated in Branksome Wood Road, Bournemouth West, and under the care of Sisters of Mercy. It admits Roman Catholics suffering from pulmonary tuberculosis and, in addition, other convalescent patients. The total accommodation is 72 beds, the wards containing from two to eight beds each. Patients furnished with a subscriber's letter pay 5*s.* weekly, the charge to non-subscribers being 12*s.* for men, 8*s.* for women, and 6*s.* for girls under 12 years of age.

Applications for admission must be made to the honorary secretary.

THE ROYAL NATIONAL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, VENTNOR, ISLE OF WIGHT.

(Founded in 1867.)

This historical institution, as is well known in this and other countries, was founded by Dr. Arthur Hill Hassall as far back as 1867.

The first block was commenced in 1868, and the first patient was received in the autumn of the following year.

The institution was intended "for the reception of patients of both sexes from all parts of the United Kingdom irrespective of religious distinctions" (*i.e.*, it is an essentially national institution). Although diseases of the chest other than pulmonary tuberculosis

are freely admitted into the hospital, by far the greater number of the patients at the present time are the subjects of pulmonary tuberculosis. For instance, in 1905, out of a total of 817 patients, there were no fewer than 775 cases of pulmonary tuberculosis, exclusive of 21 classed as doubtful tuberculosis.

Notwithstanding that the institution was founded as a "hospital," it has for many years past adopted the "open-air treatment," and at the present time it may be more properly classed as a "sanatorium." To quote from the 1904 annual report: "Open-air treatment is adopted to the fullest extent which is compatible with the well-being of each patient suffering from pulmonary tuberculosis (consumption), each patient enjoying the advantages of a separate bedroom with a south aspect, certain selected cases being placed out of doors day and night on the balconies, which shelter them from extremes of weather. Definite systematic exercise is prescribed by the medical officers for those patients who are able to take it, paths having been laid out which take advantage of the natural formation of the grounds, so that walking on the level or uphill may be practised."

The site, which comprises some 20 acres of undulating well-drained grounds sloping towards the sea, is situated amid beautiful surroundings on the "Undercliff," some three-quarters of a mile to the west of Ventnor, and it is sheltered on practically all sides but the south, where it is open to the sea. On this side, however, the undulating character of the grounds enables shelter to be secured in this direction during rough weather from the south-west.

The buildings which constitute the institution are arranged as eleven separate blocks or houses, situated in a row towards the northern limit of the site, and affording to the south—i.e., from the patients' rooms and from the balconies—pleasant views over the grounds and sea, which is some 300 yards distant.

These separate blocks, with the chapel in the centre, and which are connected by a spacious subway, have been added from time to time as the munificence of donors has allowed, the majority of the buildings having been erected "In Memoriam."

The last erected block, which accommodates 21 patients, was opened in August, 1899, by H.R.H. Princess Henry of Battenberg.

The southern aspect of these blocks is devoted to the patients' rooms, the northern to the staff.

Certain of the blocks are larger than others and contain more bedrooms, while block No. 9 comprises, in addition to bedrooms, an imposing dining-hall and the general administrative offices.

The total accommodation of the institution is 155 beds, 104 being for males and 51 for females. Each of the buildings is arranged on what is known as the separate principle—i.e., each patient has a separate bedroom—this arrangement having been

regarded as best by the promoters of the institution owing largely to the fact that under these circumstances the rest of the patient is not disturbed by the coughing of other patients or by other noises unavoidable in the case of wards.

There is a sitting-room for every 4-6 patients and a common dining-hall and chapel.

Separate accommodation is provided for each sex, the four blocks to the east of the chapel being reserved for women, and the six blocks to the west of the chapel for males. The sexes are also kept separate in the grounds, the only common meeting places being the chapel and the dining-hall.

The grounds are well laid out, and numerous shelters are provided therein.

Warming is by steam and lighting by electricity. Water is procured from a private well sunk on the estate.

The cubic space per bed varies from 1,200 to 1,800 feet.

Conditions of Admission.

Efforts are made to secure only such patients as are likely to derive benefit from the treatment—i.e., those who are in an "incipient or early stage of disease, or whose disease is arrested if in the later stages."

No applicant is received who is under 12 years of age.

Persons eligible for admission must be *necessitous*, and not in a position to defray the entire cost of their maintenance and medical treatment. But they must not be in receipt of parochial relief.

Each patient has to pay, or be responsible for the payment of, a weekly sum of 10s., payable four weeks in advance; and a deposit of £1 has to be paid on admission as a guarantee of good behaviour. It is refunded when the patient leaves the institution.

Applicants for admission must be provided with a letter of recommendation from a Governor of the Hospital and must furnish a medical certificate on a form prescribed by the hospital authorities. Each accepted letter of recommendation provides for eight weeks' treatment, and if a longer stay in the institution is regarded as desirable, a fresh letter of recommendation must be obtained.

A certain number of patients are admitted through the instrumentality of the "Frederick Fund" and the "Hamilton Fund."

A donation of 50 guineas constitutes a Life Governor, an annual subscription of 5 guineas an Annual Governor. Donors of the sum of £525 are entitled always to have one patient in the hospital.



(To face page 390.)

By presenting £1,000 to the institution the donor may secure a bed in his name in perpetuity, such donor having the right of presentation to that bed during life and the privilege of bequeathing such right to any one person.

The cost of maintenance per bed is about £2 weekly.

Results.

Turban's classification of cases was adopted for the first time in the annual report for 1904, and the full figures now furnished overleaf will be limited to that year, as similar details are not apparently comprised in the annual report for 1905. No statistical records of after results appear to have been recently published.

In the medical report for 1904 the reader is reminded that although the results of the majority of continental sanatoria may at first sight appear more promising than those obtained at Ventnor, it must be borne in mind that at this hospital "pyrexia" cases are *not* excluded.

In justification of this point the author of the medical report draws attention to what is here Table II., which contrasts the early and advanced cases; and he points out that the percentage of "improved" cases in the first part of such table is in the case of males 100 per cent., and in the case of females 94·3 per cent.

These figures represent only the immediate results on discharge, but the author of the medical report states that in the larger proportion of early cases it is found by practical experience that permanent benefit results, and that an "economic cure" is in reality effected."

A brief summary of the 1905 results is herewith given:—

Much benefited	630	Gained weight	672
In statu quo	75	Lost weight	79
Worse	58	Unaltered	24
Died	12	Average gain in weight, 8lbs. 12oz.	
<hr/>		Number of patients who gained a stone or more	112
Total cases of pulmon- ary tuberculosis	775	Highest individual gain, 2st. 3lbs. 4oz. (in 56 days).	

TABLE I.

ANALYSIS OF THE 761 CASES OF PULMONARY
TUBERCULOSIS.

						Number.	Per cent.
Hæmoptysis	...	{ Slight ... ..	...	...	...	46	6.04
		{ Moderate ... ..	...	...	...	7	.91
		{ Severe ... ..	...	...	...	8	1.05
Night sweats	...	...	...	...	...	38	4.99
Intensity of lung condition.	{ Acute ... ..	...	...	...	...	88	11.56
	{ Sub-acute and chronic ... ..	...	...	...	...	673	88.43
Extent (Turban)	{ I. ... ..	...	...	...	...	101	13.27
	{ I.-II. ... ..	...	...	...	...	20	2.62
	{ II. ... ..	...	...	...	...	148	19.44
	{ II.-III. ... ..	...	...	...	...	55	7.22
	{ III. ... ..	...	...	...	...	437	57.42
Disease	...	{ Quiescent ... ..	...	...	...	622	81.73
		{ Advancing ... ..	...	...	...	139	18.26
General condition	{ Satisfactory ... ..	...	...	...	...	510	67.01
	{ Unsatisfactory ... ..	...	...	...	...	251	32.98
Digestion	...	{ Satisfactory ... ..	...	...	...	546	71.74
		{ Unsatisfactory ... ..	...	...	...	215	28.25
Temperature	...	{ Over 101.0° F. ... ..	...	...	...	58	7.62
		{ 101.0° F. to normal ... ..	...	...	...	27	3.54
		{ 99.6° F. to 101.08 F. ... ..	...	...	...	114	14.98
		{ 99.6° to normal ... ..	...	...	...	73	9.59
		{ Normal ... ..	...	...	...	489	64.25
Tubercle bacilli...	{ Found ... ..	...	...	...	...	519	68.33
	{ Not found ... ..	...	...	...	...	193	25.36
	{ No sputum ... ..	...	...	...	...	49	6.43
Tuberculous complications	...	...	...	...	...	126	16.55
Capacity for work on discharge.	{ Undiminished ... ..	...	...	...	...	77	10.11
	{ Diminished ... ..	...	...	...	...	473	62.15
	{ Much diminished or absent ... ..	...	...	...	...	195	25.62
Result	...	{ Very much improved ... ..	...	...	...	80	10.51
		{ Much improved ... ..	...	...	...	275	36.13
		{ Improved ... ..	...	...	...	302	39.68
		{ <i>In statu quo</i> (condition unchanged) ... ..	...	...	...	58	7.62
		{ Worse ... ..	...	...	...	30	3.93
		{ Died ... ..	...	...	...	16	2.10

TABLE II.

A TABLE CONTRASTING THE EARLY AND THE ADVANCED CASES.

	RESULT.				PERCENTAGE OF IMPROVED CASES.			WEIGHT.			TUBERCLE BACILLI.			HÆMOP- TYSIS.		NIGHT SWEATING.	LABYR- INTIS.	CAPACITY FOR WORK ON DISCHARGE.		
	Much improved or improved.	Condition unchanged.	Worse.	Died.				Number Weighed.	Number Unweighed.*	Average gain of those who were weighed.	Found.	Not found.	No sputum.	Slight.	Severe.			Undiminished.	Diminished.	Much diminished or absent.
Early cases, 102 (Turban I.)	49	—	—	—	100	48	1	lb. 11 6.45 or. 6.45	19	25	5	3	—	1	22	26	1	—	—	—
Advanced cases 71 Turban III. "Acute.")	50	3	—	—	94.33	52	1	6 13.80	5	36	12	3	1	2	14	35	4	—	—	—
Males 44 Females 27	16	10	10	8	36.36	35	9	2 4.80	43	1	—	4	1	5	—	5	31 (and 8 died).	—	—	—
Males 44 Females 27	10	7	9	1	37.03	26	1	3 14.0	26	1	—	—	1	10	—	2	24 (and 1 died).	—	—	—

* The 12 cases in this column almost certainly lost weight, but were too ill for any accurate record to be taken; 9 of them died. Hence, had it been possible to include the above 12 with those who were weighed, the gain of the advanced cases in all probability would have been even less than that represented.

ST. CATHERINE'S HOME, VENTNOR.

(Opened 1879.)

This Home, which is situated in an elevated position in the town of Ventnor, is a philanthropic institution under the care of Nursing Sisters from St. Margaret's, East Grinstead. It is intended for patients of both sexes in the second or third stages of pulmonary tuberculosis; for persons, that is to say, who are regarded as ineligible for the Royal National Hospital, Ventnor, or other institutions of a similar character. Every effort is made to limit the advantages of the Home to really deserving persons among teachers, artisans, sailors, soldiers, domestic servants, and the labouring classes generally.

There are 12 beds, 6 for men and 6 for women.

Patients (or their friends) contribute 10s. 6d. per week towards their maintenance and no extras are charged. The average cost of maintenance amounts per case to £1 13s. 6d. weekly. Application for admission is made to the Sister in Charge, St. Catherine's Home, Ventnor, Isle of Wight.

The following statement is furnished in the annual report for 1905.

Between January 1st and December 31st, 1906, 32 patients were admitted, 12 patients were in the Home on January 1st, making a total of 44.

Of these—

25 went out more or less benefited.

5 went home to die.

2 died in the Home.

12 remained in the Home December 31st, 1906.

Since the opening of the Home in 1879 the total number of patients admitted amounts to 953. The Home is closed for its annual cleaning during August and September.

BENENDEN SANATORIUM.

THE FIRST SANATORIUM OF THE NATIONAL ASSOCIATION
FOR THE ESTABLISHMENT AND MAINTENANCE OF SANATORIA
FOR WORKERS SUFFERING FROM TUBERCULOSIS.

(Opened March 4th, 1907.)

A special interest attaches to this institution in that it represents the first systematic attempt which has been made in this country to provide and administer a self-supporting sanatorium for the wage-earning classes.



ST. CATHERINE'S HOME, VENTNOR.

(To face page 394.)

"The National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis" was founded under the auspices of the Hospital Saturday Fund, largely as the result of a visit to German sanatoria by certain representatives of Friendly Societies in this country.

The movement which resulted in this Association had its origin, as I am informed by Mr. C. H. Garland, chairman of the Council, in the combination of two distinct movements, the first of which was inaugurated at a congress of postal officers held at Leeds in March, 1903, and having for its object the provision of sanatorium accommodation for the postal service. The second was a movement inaugurated in May of the same year providing similar accommodation for members of Friendly Societies and Trade Unions. After consultation, it was determined to combine the two movements, forming the Post Office organisation into a registered Friendly Society for the purpose of maintaining beds in the institution erected by the larger body. This has now been carried out, the Post Office branch having been registered as a Friendly Society in January, 1907.

Although the Association was only formally established in October, 1905, much work had already been accomplished by a Provisional Committee which has existed since the special meeting of the Board of Delegates of the Hospital Saturday Fund on May 23rd, 1903.

At an early stage in its existence the Provisional Committee determined, in the first instance, to aim at the erection of a sanatorium for 200 patients, the cost of such provision to be covered, if possible, by public subscriptions. It was further decided that the institution should be upon a scale less expensive than other and similar enterprises, and that, having been erected and duly equipped, the sanatorium should be self-maintaining, i.e., that there should be no further appeal on its behalf to the public.

In establishing the institution the affiliated Friendly Societies and Trade Unions were to be invited to endow beds at the rate of £65 each per annum, and on the understanding that such beds were to be reserved, so far as practicable, for early and suitable cases.

The Association, which has been honoured with the Presidency of H.R.H. Princess Christian of Schleswig-Holstein, and has obtained the services of a number of influential persons as Vice-Presidents, was registered on September 20th, 1905, and the first annual meeting under the Articles of Association was held on October 25th, 1905, when a Council was duly appointed.

It should be stated too, that the Council, over which Mr. Garland has presided with so much success, has throughout had the advice and assistance of Dr. T. Lister, one of the Physicians of the Mount Vernon Hospital for Consumption, who also acted as Chairman of the Sites and Building Sub-Committee.

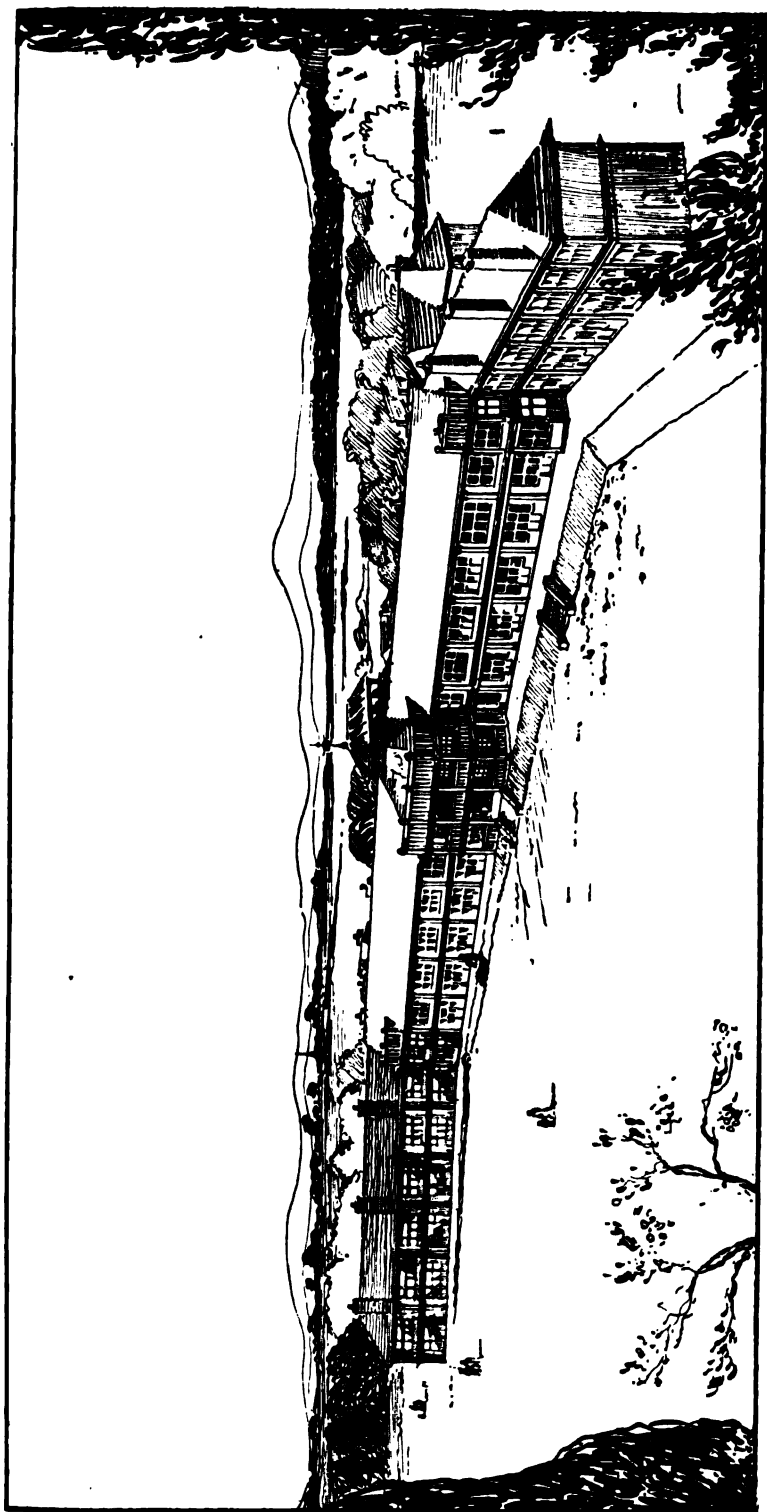
Appeal for building funds met with cordial response not only from the charitable public, but also from the Friendly Societies and Trade Unions. The Hospital Saturday Fund contributed £500, and the Post Office Branch of the National Association £450. By the permission of the Postmaster General, fines paid by postal employes are to be devoted to the building fund.

After numerous inquiries and inspections, a site of 252 acres of land having been secured at Benenden in Kent for £5,800, the foundation stone of the sanatorium was laid by the President, H.R.H. Princess Christian, on Saturday, July 14th, 1906.

Response to the invitation to subsidise beds has been encouraging; for instance, in the Postal Branch of the Association, no fewer than 40,000 employes of that branch have agreed to a reduction from their pay of 2s. per annum towards the cost of maintenance of beds. Fifty-two beds have already been taken up by various bodies as follows at the rate of £65 per bed per annum :—

						Beds.
The Post Office Branch	...	...	...	...	...	25
The Hospital Saturday Fund	...	...	...	...	...	15
Hearts of Oak Benefit Society	...	...	...	...	...	5
Club and Institute Union	...	...	...	...	...	2
National Union of Teachers	...	...	...	...	...	2
A.O.F., South London District	...	...	...	...	...	1
Amalgamated Society of Railway Servants	...	...	...	...	...	1
Royal Oak Benefit Society	...	...	...	...	...	1
Total	...	...	...	...	...	52

The immediate site of the sanatorium is in the Weald of Kent, some two miles north-east of the village of Benenden, and seven miles south of Headcorn station on the South Eastern Railway. Its elevation ranges from 200 to 250 feet above Ordnance Datum. Geologically this portion of the site consists of Tunbridge Wells sands overlying the Wadhurst clay of the Wealden strata. At the bottom of the valley, in front of the sanatorium, is a small stream which apparently takes its rise at the junction of these two formations. The site comprises some 252 acres of land, for the most part in pasture, consisting of two farms—one (Cleveland) of some 160 acres, the other (Colebarn) of some 92 acres. This extensive area has been acquired in anticipation "that selected patients whose disease is arrested shall perform a certain amount of outdoor work, and that in time a properly equipped farm for the partial training of suitable cases in agriculture and allied pursuits may be developed. It is hoped that in this way they may be fitted for a return to wage earning under different conditions from those under which they acquired consumption, and that regrettable relapse may thus be avoided."



THE BENENDEN SANATORIUM.

The first institution erected by the National Association for the Establishment and Maintenance of Sanatoria for Workers suffering from Tuberculosis.

(To face page 396.)

The buildings are in four main sections :—

- (1.) Central block for 68 patients.
- (2.) Pavilions for ten patients in each, with a recreation room and lavatory attached, to be placed in suitable positions.
- (3.) Administrative block and dining hall.
- (4.) Laundry and electric light block.

The sanatorium (*see accompanying plate*), the centre of which faces due south and has a pleasing prospect, is a two-storied building (ground and first floor) with two wings, one of which faces a little south-west the other a little south-east. It is erected on the southern slope of the more northern portion of the site, and in such a position as to secure shelter from the north by the rising ground behind. It is proposed, however, to further increase this shelter by a belt of trees both on the north and east.

Each wing, or half of the sanatorium proper, may be regarded for descriptive purposes as comprising, as it were, two separate portions divided by a staircase. That portion of each wing nearest to the centre comprises on each floor five separate wards, approached from a well-lighted corridor on the north five feet in width. The wards, which will each contain one patient, measure severally 12 ft. \times 10 ft. \times 10 ft. (*i.e.*, 1,200 cubic ft.), and they are furnished on the south with large casement windows and on the north, above the door level, with fall-to windows, thus affording through ventilation. On the far side of the staircase the northern corridor is absent, and there are on each floor six cubicles containing two beds each and measuring in each instance 12 ft. \times 12 ft. \times 10 ft. = 1,440 cubic ft., *i.e.*, 720 cubic feet per patient. Each of these cubicles is lighted and ventilated by a large casement window, with fall-to tops, on the north and south, while in the cubicles at the free end of each wing is a large third window. There is, in addition, a ventilator beneath each bed.

Behind the centre of each wing is an annexe, cut off from the wing by cross ventilation, and comprising on each floor two bathrooms, three w.c.'s, and a boot-room. There are also on each floor of each wing a small ward kitchen and a cloakroom.

In the centre of the main building is a lobby and a large recreation hall measuring 30 feet by 25 feet, opening on the south to a verandah and to the grounds beyond, while on the first floor is a gallery and another verandah. Throughout the front of the sanatorium is a wide terrace on to which the beds from the wards on the ground floor can be wheeled through the casement windows. Behind the sanatorium proper is a large dining hall for the accommodation of 200 patients, and to the west of this is the administration block containing, on the ground floor, the kitchen and the medical officer's, matron's and nurses' rooms, together with the usual other offices. On the first floor

are the bedrooms of the staff. The kitchen is a one-storied structure with top lights and ventilation. The 10 room pavilion, the wards of which measure 10 feet by 12 feet by 8 feet, equal to 960 cubic feet each, are one-storied structures with a recreation room 22 feet 10 inches by 12 feet 6 inches at one end and lavatory and bathroom accommodation at the other.

The scheme of the building, so far as sanatoria are concerned, is believed to be quite unique, and has been designed by Mr. A. William West, who has most liberally placed his architectural services at the disposal of the Committee. The foundations of the building are composed of concrete, and upon these are erected walls, consisting of hollow stone slabs, known as Frazzi ware, some 3 inches thick and 12 inches square. The walls, the slabs composing which are jointed with mortar, are supported at all corners with vertical iron stanchions, the ceilings being constructed horizontally much in the same fashion. The outer walls of the building are filled in with Frazzi cement rough-casted, the inner plastered with serapite, the total thickness of the outside walls being only a little under 5 inches. The floors of the ground floor are composed of concrete with timbers at intervals, and above this a surface of strong teak boarding. On the first floor the hollow stone slabs are supported by horizontal iron girders, and above these there is concrete and teak as on the ground floor.

The interior of all walls and ceilings is covered with white enamel, and all corners are rounded off in the usual fashion.

The roof is of red tiles and the woodwork is painted green.

The great saving in cost which accrues from the use of the material in question as compared with brickwork is due largely to the fact that the foundations required are of a much lighter and hence less costly nature, while the other advantages claimed are that a building of this material can be rapidly constructed, that it is warm in winter and cool in summer, and that it is fireproof throughout.

As regards rapidity of construction, it may be pointed out that the foundation stone of the institution was laid by H.R.H. Princess Christian on July 7th, 1906, and that on March 4th, 1907, the first portion of the sanatorium was opened for patients.

Warming is by means of anthracite stoves in the wards and open fireplaces in the administration block, and lighting for the present by the "white" light. It is hoped, however, that electric light may eventually be installed.

The drainage is taken to a small septic tank and thence to a bacterial filter, the effluent from this passing to the small stream already mentioned.

The water supply is derived from a boring (12 inches in diameter) at the lower portion of the site sunk into the Tunbridge Wells sands to a depth of 150 feet, the first 30 feet being lined

by an iron cylinder. From here the water is raised by means of a $3\frac{1}{2}$ h-p. oil engine to a service reservoir at a level of some 290 feet O.D., the pump being capable of raising 2,000 gallons per hour. From this elevation the water is supplied by gravitation to the sanatorium.

Disinfection is carried out by a Washington Lyons apparatus fixed in the basement of the main building, and the sterilizing of sputum on the plan adopted at the Frimley Sanatorium, *i.e.*, by means of a specially designed apparatus in which the sputum may be submitted to the action of steam under pressure.

It is anticipated that the total cost per bed at this institution will work out at not more than £100; exclusive of the cost of land, of electric light installation, and of furnishing, but inclusive of the water supply. It is hoped later on to extend the accommodation, which is now for 68 patients, to 200 by the addition of pavilions to hold 10 beds each.

On my visit to this institution I was accompanied by Mr. Garland, chairman of the Council, and Mr. Bunn, hon. secretary of the Association, to both of whom I am much indebted. I have also received valuable assistance from Mr. West, the honorary architect.

Certain Economical Considerations in Relation to the Scheme.

In an appeal to Friendly Societies and Trade Unions which was issued by the Association in 1906, some interesting data are furnished.

As regards Friendly Societies it is pointed out that although the members being admitted only after medical examination may be regarded as "selected lives," they are by no means free from tuberculosis. Taking the Ancient Order of Foresters as a type of the Friendly Societies of Great Britain, Mr. J. L. Stead, the secretary of the former society, makes some calculations as regards the deaths from consumption for the five years ending 1901.

The total membership, including the wives and widows of members, was on December 31st, 1900, as follows:—

Benefit Members	...	...	...	...	...	580,405
Wives and Widows of Members	...	...	...	...	...	224,374
Total	...	...	...	...	...	804,779

From a tabular summary of deaths, Mr. Stead shows that in the five years 1897–1901 there were 5,320 deaths from consumption amongst benefit members, and 1,626 amongst the wives and widows of members, *i.e.*, that there were 6,946 deaths due to one disease alone during the period in question. The deaths from consumption amounted to 15.11 per cent. of the deaths from all causes in the case of the benefit members, and 13.23 in the case

of wives and widows of members. Mr. Stead thinks that this number does not quite represent the full measure of the tax made by consumption on the "Foresters," and he estimates the total figure at 7,000.

As regards the cost of pulmonary consumption to Friendly Societies there is, the appeal states, reason to believe that Friendly Societies would benefit by engaging in some scheme for the prevention of tuberculosis and its curative treatment among their members, and reference is made to data collected by Mr. Alfred Chapman and Mr. Russell of the South London District of the Ancient Order of Foresters. Referring to the experience of Court "Princess Royal," No. 3395, of which he is secretary, Mr. Russell shows that during the last ten years, 18 members have died: five from consumption and 13 from other causes. Sick pay in the two classes of places has been as follows:—

	Total.		Average per Member.	
	Days.	Amount.	Days.	Amount.
To the five consumptives ...	987	£ 105	197	£ 21
To the 13 other cases ...	822	91	63	7

It is believed that the experience of Court "Princess Royal" is likely to be that of other Courts, and upon this basis it is inferred that the average sick pay of consumptive members costs three times as much (or £14 more) as the average sick pay to members dying from other causes.

Mr. Chapman accepts these figures as a basis for a more extended estimate embracing the larger body of the South London District of the Order.

He found that during the 24½ years, 1880 to June, 1904, there had occurred 425 deaths from consumption amongst the members, and that the average age was forty years (nearly).

Including the above 425 consumption cases, 2,294 members died from *all* causes, the average age at death being 52½ years. Exclusive of the 425 consumption cases, the average age amongst the remaining 1,869 was 54½ years.

Mr. Chapman interprets these figures as showing that in the South London District the lives of 425 members have been cut short through consumption by at least 15 years, and he represents the financial loss as follows:—

In the 24½ years 425 members died from consumption. This number multiplied by £14—the excess of sick pay to consumptives as shown by the "Princess Royal" figures—amounts

to £5,950, which may be taken to represent the total amount of sick pay to consumptive members. This sum at 4 per cent. interest amounts to £9,526, the excess relief due to consumption. Furthermore, it is claimed that as 425 consumptive members died 15 years before they otherwise would have done, there has been on the average a loss of 15 years' contributions to the District Funeral Fund, and this at the lowest computation of 4s. per annum involves an actual loss to this fund of £1,275, which at $4\frac{1}{2}$ per cent. interest (the rate actually realised) amounts to a total of £1,766. The whole loss is thus summarised :—

	Amount.
Loss to Court Sick Funds	£ 9,526
Loss to District Funeral Funds	1,766
Total	£11,292

Loss through contributions to the Sick Fund has not been included in the estimate, for the reason that if the consumptive members had lived for 15 years in each instance instead of dying, they would have been eligible for sick pay which would have absorbed the contributions payable. Mr. Chapman thinks that these general conclusions represent a loss rather below that which actually occurs.

The appeal from which these figures are abstracted states that, on Mr. Chapman's computation, the cost per consumptive patient would amount to from £26 to £27. But this estimate is based on the assumption that the disease has actually cut short life by 15 years. The appeal adds :—

" Unless it can be proved that the sanatorium treatment can prolong the life for the same period and abolish the sickness, there is no chance of claiming that the total sum would be saved. The sum of £14, the excess of sick pay over that paid to other invalids, does, however, approximate closely to the amount of £16 likely to be required for curative treatment (thirteen weeks at £1 5s. per week), and if there be added to this the continued contribution to the funeral fund for five years at 4s. per year, a total of £15 is reached, which does not fall far short of the full sum. If the member were by the treatment placed in a position to continue his full contributions, and ceased to be an abnormal charge on the sick funds for five years or more, we should approach very near to a demonstration that it would be to the advantage of the societies to undertake the treatment of their members in sanatoria "

The figures relative to the Hearts of Oak Benefit Society have been investigated by Mr. Burnes, the secretary. In this Society the deaths from all causes in 1903 amounted to 2,058, the average age being 47·65 years. Of these, 361 died from

consumption at the average age of 40 years. Of the total 2,058 there were 742 who died under 40 years of age, 207, or 28 per cent. of them dying, from consumption at the more valuable period of life.

In 1904 the deaths from all causes numbered 2,110, and of these 377, or 18 per cent., died from consumption at an average age of 40 years.

Of the total 2,110 there were 673 who died under 40 years of age, and 33 per cent. of these were persons suffering from consumption.

As regards the sickness records during the past 10 years, it was found that of those who died in 1904, eliminating for the purpose of the inquiry those members who died but whose membership was under 10 years, the average sickness for the consumptive members for the previous 10 years was 58·38 weeks = £41 12s. 0d., whereas the average sickness of all other members during the same period was 34·97 weeks, equal to an expenditure of £23 15s. 9d. Therefore the consumptive members draw 23·41 weeks' sick pay, or £17 16s. 3d. more than other members who died under 40 years of age. It is claimed that this sum of 17 guineas would form an ample provision for sanatorium treatment if it could be assured that all of it would be saved as a result of the treatment, *i.e.*, upon the assumption that the disease would be arrested, and this charge on the sick fund reduced to the level of the charges of other invalids. It is added that actual experience can alone show how far this assumption would be realised, but it is thought that the figures form a *prima facie* case in support of the view that the experiment should be undertaken. It is regarded, however, as an essential for such an experiment that suitable cases should be chosen and treated in their very earliest stages.

The Council of the National Association, with a view to the detection of early cases, has recommended the diffusion of suitable literature amongst the members of every subscribing organisation.

Medical certificate forms have been drawn up by this Council indicating all the data necessary for a correct judgment as to the state of the patient applying for admission. Such forms, duly filled up by the patient's medical attendant, are required to be forwarded first to the local secretary and by him to the central secretary, whose business it is to refer the case to one of the duly appointed medical referees for a report as to suitability or otherwise of the case for treatment in the sanatorium.

It would appear that some very valuable data as to the utility of sanatoria for the working classes are likely to be gathered through this institution. Thus it will be possible to ascertain the previous and after-history of every case admitted thereto, and therefore to compile statistics which, if kept in such a

fashion as to bring out clearly the precise facts in every case, should be instrumental in furthering knowledge and indicating the lines upon which future developments might take place.

The fact that the Friendly and Trade Union Societies are able to keep in touch with their members should enable the fullest particulars as to after-histories to be secured, including data as to the physical condition of the patient and the amount of the wages which he is capable of earning. In other words, data somewhat on the lines of those procured under the insurance system in Germany should be obtainable.

It would appear, on the authority of Mr. Burnes, that the sick benefit in a friendly society varies from 10*s.* to 12*s.* per week in the smaller societies to 18*s.* in the larger; that in the Hearts of Oak Society, which numbers nearly 300,000 members and has a reserve fund of nearly £3,000,000, the rates payable to *free* members during sickness is 18*s.* per week for 26 weeks. Should the illness continue beyond that period, half pay, *i.e.*, 9*s.*, is granted for another period of 26 weeks. If the member has not recovered from the illness at the end of that period, he is placed on reduced sick allowance weekly according to the following scale, *viz.*—If a member under six years, 2*s.*; if a member six years and under eight years, 3*s.*, and if a member eight years and upwards, 4*s.* per week. While in receipt of reduced sick pay, a member is relieved from payment of contributions.

It may be added, as it is a question which materially affects the tuberculosis problem, that candidates for admission to the Hearts of Oak Society must be between 18 and 30 years of age, and must be in receipt of a wage or income of not less than 24*s.* per week. Miners are not eligible for election; and a medical examination is necessary in all cases.

It will be seen by these restrictions that the members must be regarded as a relatively fit or selected class, not only by virtue of the minimum wage necessary for membership, but also on account of their having passed a medical examination.

The sick allowance referred to above has an important bearing upon the prospects of the patients in the sanatorium, since their families may be regarded as at least partially provided for during six months, a fact which should often enable a member to receive the full benefit of sanatorium treatment.

The interest manifested in this scheme by the working classes may be gathered from the fact that the following Societies are already represented by delegates on the Association:—

- Amalgamated Society of Railway Servants.
- Ancient Order of Foresters, London United District.
- Ancient Order of Foresters, Luton District.
- Ancient Order of Foresters, South London District.
- Barge Builders' Trade Union.
- Bethnal Green Working Men's Benevolent Society.

Board of Guardians for Relief of Jewish Poor.
 Church of England Temperance Benefit Society.
 Co-operative Wholesale Society, Limited.
 Fawcett Association (Post Office Sorters).
 Hearts of Oak Benefit Society.
 Hornsey Rise Guild of Temperance.
 Independent Order Oddfellows, M.U., South London District.
 Independent Order of Rechabites, Surrey and North Kent District.
 London Grand Division of Sons of Temperance.
 London Society of Compositors.
 Messrs. Carter, Paterson & Co., Limited.
 Mutual Aid Society, Wood Department, Royal Arsenal, Woolwich.
 Mutual Friendly Aid Society.
 National Deposit Friendly Society.
 Postal Telegraph Clerks' Association.
 Postmen's Federation, London District Council.
 Postmen's Federation, West Central District.
 Royal Arsenal Co-operative Society Employees' Association.
 The National Association for the Prevention of Consumption.
 Teachers' Benevolent and Orphan Fund.
 Teachers' Provident Society.
 United Juvenile Order Total Abstinent Sons of the Phoenix.
 United Order Total Abstinent Sons of Phoenix.
 Woolwich Sanatorium Committee.
 Working Men's Club and Institute Union, Limited.

EAST CLIFF HOME, MARGATE.

(Opened 1898.)

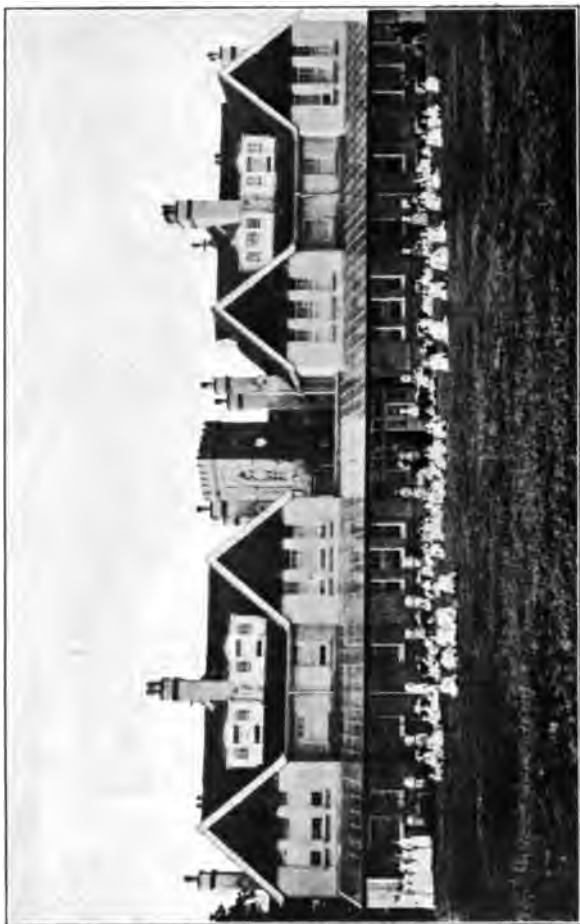
This Home was founded by the St. Pancras Guardians in November, 1895. In 1898 it was taken over by the Metropolitan Asylums Board, and in 1901 the number of beds was increased to 91 by the addition, to the south of the old building, of two blocks for 25 beds each. In 1903 other 30 beds in the open air were added by the erection of a wide verandah. These latter alterations are shown in the accompanying plate.

Arrangements are made there for sea-bathing in suitable cases.

The total accommodation of the Home in 1906 was 130 beds, and the inmates are children with tubercular bones and glands (surgical cases).

The average stay in this Home is about six months, but, if necessary, children are kept two years or longer.

Miss Emily K. Jacob is the Resident Matron, and the Medical Officer is Mr. W. J. Sutcliffe, F.R.C.S., of Margate.



EAST CLIFF HOME, MARGATE.

For the treatment of metropolitan children suffering from tubercular affections of the spine, bones and joints. In the front of the home is the verandah in which a large number of the children sleep.

(To face page 404.)

Cost per head, &c.

	A.	B.	C.	D.	E.
—	Average daily number of inmates.	Percentage of average daily number to normal accommodation.	Permanent officers (all grades). highest number.	Maintenance and clothing per inmate per day.	Total cost per inmate per day including all charges.
Half-year ended Lady-day, 1905.	128	98	30	d. 5-90	s. d. 1 8½
Half-year ended Michaelmas, 1905.	121	93	32	6-17	1 8½

N.B.—The figures given in column E do not include rent or loan charges, special expenditure, and head office or central expenses.

Results.

In his Annual Report for 1905 Mr. Sutcliffe states that during that year 421 children were under treatment, the greater number of the cases being of surgical tuberculosis. He has found the open-air verandah of great value, in promoting recovery.

The great majority of the cases suffer from tuberculosis of the spine or hip, and such cases are kept in bed for many months if necessary. Mr. Sutcliffe adds that—

Several of the more extensive gland cases have been treated by operation, and a large number of infected glands have subsided without active interference after some months residence at the Home.

The possibilities of East Cliff Home in the treatment of the numerous poor law children affected with tuberculous disease might, with advantage to the parishes concerned, be even more freely utilised by Metropolitan guardians, as it is generally recognised that only in a suitable environment can any approach to a permanent cure be effected, and as practically no limit is placed on the duration of stay it is often possible to return children entirely recovered and no longer likely to be dependent on the ratepayers for support.

ROYAL SEA-BATHING HOSPITAL, MARGATE.

(Founded 1791.)

This institution possesses an historical interest by virtue of having been the first of its kind either in this or any other country; and although it is not exclusively devoted to tuberculous maladies, it must be regarded as, in the main, a hospital for tuberculosis of the glands, joints, and bones, there being also a few beds set apart for cases of pulmonary tuberculosis.

The institution was founded by Dr. Lettsom, an eminent physician of the City of London, and the hospital was intended primarily for London, and secondarily for other parts of the country. Margate was selected as the site, owing to the reputation which the air of this place had long enjoyed for its salubrious properties, and on account of the accessibility of Margate from the Metropolis viâ the Thames.

The demands which were made upon the institution led to its gradual expansion, and in 1881 it contained as many as 250 beds.

The accommodation at this date was, however, not very satisfactory. The late Sir Erasmus Wilson, F.R.S., about that time President of the Royal College of Surgeons, and, after John Hunter, its greatest benefactor, was however instrumental in practically transforming the institution by building a new wing for 60 beds wherein the cubic space per bed, formerly only from 700-800, was increased to 1,500 cubic feet. He also added a handsome chapel.

But notwithstanding, or rather, perhaps, in consequence of the munificence of Sir Erasmus Wilson in structurally improving the institution, the annual income in subsequent years fell short of the expenditure necessitated by its enhanced popularity, and in 1892 the Directors were reluctantly compelled to close 140 beds, thus leaving but 80 to carry on the work of the institution.

Subsequently additional funds were forthcoming, and the total number of beds is now 162 inclusive of 12 beds in the isolation block.

The hospital occupies a site of some eight acres in extent on the sea front at the western extremity of Margate, the adjoining beach being approached by a private gateway from the institution.

The hospital comprises, as will be seen from the accompanying plate, an extensive series of buildings, the front of which faces an open space abutting upon the Canterbury and Margate road. These buildings include the general wards and, in addition, the administration offices together with a residence for the medical officers.

There is a thoroughly modern operating theatre facing the sea, and an electro-therapeutic department fitted with X-rays and other up-to-date apparatus.

The general wards, which are provided with hot and cold sea-water baths, are utilised largely for "dressing" the tubercular joints and glands, and for sleeping accommodation during unusually inclement weather. For the most part, however, the patients remain both by day and night on the verandah surrounding the "quadrangle." In this position the patients while in their beds are able to enjoy the sea air both by day and night, while those who are able to move



(To face page 406.)

about secure exercise in the grounds and, in suitable cases, sea-bathing on the beach.

During 1905 the average daily number of patients was 121·7, and the mean residence in days 77·9. The average cost per occupied bed calculated on the ordinary expenditure was £70 9s. 9d. per annum, or £1 7s. 1d. per week.

It is a matter of considerable interest in connection with the open-air treatment of tuberculosis that, as the official account of the institution expresses it :—

"It may be noted as to the credit of the hospital that it has anticipated by more than a century the modern open-air treatment of tuberculosis. From its foundation it has been the practice not only to send out of doors all patients who could walk, but to place in the open air, on beds and couches in the verandahs and gardens, all who could endure the movement, and allow them to remain there for a considerable part of every fine day."

The most suitable cases for admission to the hospital are thus summarised by the Medical Board :—

"Most varieties of tuberculous disease, if sent early enough, are admitted with advantage ; among them may be mentioned affections of bones, joints, glands, eye and skin, pulmonary phthisis in its incipient stage, affection of the fauces and larynx, of the abdomen, of the kidneys, bladder, and testis. It is necessary to emphasise the desirability of sending these tuberculous cases to the dry bracing air of the Isle of Thanet at the earliest possible period, at which time only is complete recovery, or even a satisfactory result, to be expected."

Patients are admitted through a letter of recommendation and the approval of the Medical Board, subject, of course, to the necessary vacancy. The monthly payments are £6 for full-pay patients, and 48s. and 32s. for ordinary patients (according to age). Each letter is available for eight weeks treatment, and if a longer stay is desirable an additional letter must be procured or an "ordinary patient" must become a "full-pay patient." There are also a limited number of free letters.

There is also a small out-patient department, for treatment at which a payment of 4s. monthly has to be made.

The tables furnished below, which are taken from the Annual Report for 1905, are illustrative of the work carried on at this institution :—

Patients Discharged and Results of Treatment, 1905.

—	Cured.	Greatly Benefited.	Benefited.	Un-benefited.	Died.	Totals.
Men ...	18	54	39	13	3	127
Women ...	28	55	58	22	2	165
Boys ...	14	52	19	14	2	101
Girls ...	17	43	12	12	1	85
	77	204	128	61	8	478

*Classification of Diseases.***A.—TUBERCULOUS DISEASE OF THE JOINTS.**

Hip.	Knee.	Ankle.	Shoulder.	Elbow.	Wrist.	Sacro-Iliac.
56	30	9	1	13	6	2

B.—TUBERCULOUS DISEASE OF BONES.

Spine.	Sacrum.	Ilium.	Pubes.	Femur.	Tibia.	Foot.	Humerus.	Hand.	Ribs and Sternum.	Scapula.
27	1	7	1	11	8	13	1	1	5	1

C.—TUBERCULOUS DISEASE OF LYMPHATIC GLANDS.

	Cervical.	Axillary.	Inguinal.	Mesenteric.
	111	9	2	4

D.—VARIOUS.

Tuberculous Peritonitis.	Phthisis.	Lechio-Racal Abscess.	Sinuses (in Stumps, &c.)	Tuberculous Ulceration of Skin.	Multiple Tuberculous Lesions.	Lupus.	Empyema.	Pleurisy with Effusion.	Convalescents from various Ailments.
14	51	1	6	6	7	14	9	1	2

There were 287 operations during 1905 and of this number 129 were cases of excision of glands. I am indebted to Mr. Bertram Thornton, Senior Surgeon to the Hospital and Medical Officer of Health of Margate, for particulars with regard to this institution. The London office of the hospital is at Trafalgar House, 13 Charing Cross, S.W.

**THE VICTORIA HOME FOR INVALID CHILDREN,
MARGATE.**

(Founded in 1892.)

This institution is for the reception of tuberculous children of the poor who require nursing and surgical treatment over a longer period than can be accorded to similar cases in general hospitals.

The Home, which is a purely charitable institution, consists at the present time of three dwelling-houses which have been made to communicate with one another. These houses are situated on Sea-View Terrace to the west end of Margate and near to the Royal Sea Bathing Infirmary

The institution overlooks the sea, and there is balcony accommodation in connection with the wards. The total accommodation consists of 46 beds, which are for the most part maintained by voluntary subscription. Certain beds are, however, allocated to the London, Evelina, and Shadwell Hospitals, while two beds have been privately endowed. There is also a fund known as the Rachel Samaritan Fund, which was inaugurated in 1901 with the object of maintaining a free cot and of generally assisting in the support of the Home.

The terms of admission are five shillings weekly. Boys over 12 years of age and girls over 15, as also incurable cases, are not eligible. The Committee of the Hospital do not regard the present arrangement as a satisfactory one, and it is in contemplation, if the necessary funds are forthcoming, to erect a well-equipped but inexpensive building of the bungalow type.

The Honorary Medical Officers are Dr. Frank Nichol and W. Greenwood Sutcliffe, Esq., F.R.C.S.

Applications for admission and information need to be addressed to the Hon. Secretary, Miss F. A. Cooper, 25, Blomfield Court, Maida Vale, London, W.

CLAYTON VALE (SMALL-POX) HOSPITAL, MANCHESTER.

This hospital, which is situated on the outskirts of Manchester, was used formerly as a factory and it comprises, in addition to what was once the factory proper, a detached mansion, which is now used for purposes of administration, and as a residence for staff, together with another detached house utilised for male tuberculous patients, and a group of cottages on the opposite side of the grounds, which is used for the female patients. There are, in all, 32 beds; 16 for males and 16 for females.

For the most part the patients admitted are suffering from pulmonary tuberculosis in a more advanced phase of the malady

than is the case with those who are sent by the Corporation to the Crossley Sanatorium; in fact, as far as Manchester is concerned, the Clayton Vale Hospital occupies as regards tuberculosis a position midway between the sanatorium and the Crossley "Home of Peace;" indeed, some patients have, it appears, at different periods of their illness visited all three of these institutions, as well as, in some instances, of the Bowdon Sanatorium.

It will be seen by the account furnished in Chapter XIX., that although the Clayton cases are nearly all in an advanced stage of the malady the results of treatment have been decidedly encouraging.

Unfortunately, since Clayton Vale Hospital was first used for cases of pulmonary tuberculosis, outbreaks of small-pox in Manchester have, on several occasions, necessitated disuse of the hospital for prolonged periods for purposes of consumption.

CROSSLEY "HOME OF PEACE," MANCHESTER.

The home, which was instituted for patients in the advanced stages of pulmonary tuberculosis by Mr. W. J. Crossley, M.P., donor of the Crossley Sanatorium in Delamere Forest, is situated in Ashton Old Road, Openshaw.

The home consists of what was formerly a private house, and it affords accommodation for twenty-five patients. There is a small garden attached to the Home.

LIVERPOOL HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.

(Founded 1863-4.)

The charitable endeavour of which the existing hospital is the outcome was commenced as far back as 1863-4, when a small house in Crown Street, Liverpool, was utilised as an out-patient department. This accommodation soon became inadequate for the demands made upon it and the work was transferred to Soho Street.

Ten years later, in 1874, a freehold dwelling-house on the present elevated site, on Mount Pleasant, Liverpool, was purchased, and in 1879 the leasehold of an adjoining house, also on the existing site, was secured, and in-patient work commenced.

In 1903 the Hospital Committee purchased the freehold of this house from the Liverpool Corporation, and thus the whole site between Rodney Street and Roscoe Street became the freehold of the Committee in which this Hospital is vested.

The buildings proved, however, of an unsatisfactory nature, more especially for the modern treatment of pulmonary tuberculosis; so that in 1903-4 the hospital was entirely rebuilt. It was opened by the Countess of Latham, on December 22nd, 1904, and the patients were admitted on January 1st, 1905.

The present building, which obtains an abundant supply of fresh air and sunlight, comprises accommodation for 30 in-patients, 15 males and 15 females. For each sex there is provided one large ward for 10 beds, and five single-bedded wards. There is also a common dining hall and day room, both for the males and for the females.

The building generally is erected upon modern lines, with the usual impervious floors and walls.

Warming is by means of radiators and open fireplaces, and lighting is by electricity.

All the wards have access to the *Liegehalle*, which overlooks the garden attached to the institution.

The out-patient department has also been renovated, and two additional consulting rooms, with facilities for laryngological observation, have been added.

Part of the building formerly used for patients now serves as an administrative block and nurses' home.

There were 132 in-patients and 1,788 out-patients in 1906, and the following table is abstracted from the forty-third annual report.

In-patients.

Admitted during 1905 :—			Of these there were :—		
Phthisis ...	...	118	Recovered ...	...	79
Bronchitis and Asthma	...	11	Relieved ...	...	26
Anæmia and Cardiac ...	...	3	Deaths ...	...	6
			Remaining in hospital	...	21
		<hr/> 132 <hr/>			<hr/> 132 <hr/>

During 1906 a new laboratory was added to the hospital, and arrangements made for the carrying out modern researches in connection with the opsonic index treatment, and during 1906 some thirty patients were so treated. The results up to the present are stated to have been encouraging, and it is pointed out that if the treatment is ultimately satisfactory it will enable a working man to undergo treatment without depriving his wife and family of his support, seeing that such treatment does not seriously interfere with the employment of the patient.

Terms of Admission.

Patients unprovided with a subscriber's letter are charged 7s. 6d. weekly; those recommended by subscribers, 5s. Patients nominated by subscribers pay 2s. 6d. per week.

On the termination of the period for which a letter is available, the patient, if allowed to stay longer in the institution, must either pay the full 7s. 6d., or secure an additional recommendation or nomination. Patients nominated for certain endowed beds are free.

One guinea per week is charged for the private ward.

I am indebted to Mr. Alfred Shawfield, the Secretary to the Hospital, for information relative to its work.

"MOOR END" HOUSE, SHEFFIELD.

The Sheffield Corporation has recently, after a public inquiry by the Local Government Board, and under the advice of Dr. Scurfield, its Medical Officer of Health, expended the sum of about £1,000 in the adaptation of a former private residence known as "Moor End," for use as a home or hospital for the education of patients suffering from consumption, and for the selection of cases suitable for treatment in a sanatorium. The Corporation has for some time had under consideration the question of providing a sanatorium of its own, but it has been decided, at any rate in the first instance, to obtain experience, in a more economical fashion by sending selected patients to sanatoria belonging to other bodies.

"Moor End" is situated within the borough limits, on a site of one-and-a-half acres, and at an elevation of some 500 feet above Ordnance Datum.

Cases admitted for educational purposes will be kept at the home for from four to six weeks, there being at present accommodation for 20 patients in all.

METROPOLITAN INSTITUTIONS FOR PULMONARY TUBERCULOSIS.***BROMPTON HOSPITAL FOR CONSUMPTION.**

(Founded 1841.)

This institution has figured so prominently in the history of pulmonary tuberculosis that a brief description only is necessary in this report.

* Reference is here made to certain metropolitan institutions not exclusively for tuberculosis, but into which a considerable number of consumptive patients are as a matter of routine admitted.



THE BROMPTON HOSPITAL FOR CONSUMPTION.

(To face page 412.)

The work of the hospital, which was commenced at Chelsea, has for very many years been carried on in the existing institution, which consists of two buildings separated above ground by the Fulham Road but connected by a subterranean passage. The main building, which is to the north of the Fulham Road, occupies the central portion of a site some three acres in extent. It is bounded on the north by a church and one of the gardens in Onslow Square, and on the east and west respectively by Sumner Place and Foules Terrace.

The older building consists of two wings joined together by a central portion, the whole forming an H-shaped building.

The main entrance, which is in the central portion, faces the Fulham Road, but there are, in addition, two other entrances; one on the east, which communicates with the administrative quarters, the other on the west, which is for the use of the patients and visitors.

On the ground floor, there is in the west wing accommodation for the Medical Staff, and in the east wing for the Lady Superintendent, Secretary, offices, &c.

The first floor contains the wards and offices for 87 female patients, and for the Head Nurse, while the second floor is occupied by the male patients, for whom there are 93 beds.

On the third floor is the sleeping accommodation for the staff.

The more recent building, that on the south of the Fulham Road, provides accommodation for 138 additional in-patients, and comprises the out-patients department. It consists of a main building facing the Fulham Road and three extensions southwards. The ground floor comprises the out-patient department on the east with rooms for the resident staff on the west. There is also here a spacious lecture hall. On the first, second and third floors are wards, &c., for the in-patients.

In 1902 the old system of artificial ventilation which had, up to that time, been in vogue in the main building, was replaced by natural ventilation, and at that date also the classification of in-patients according to the phase of their disease was commenced.

The medical reports of this institution contain some very interesting data, and a few of such data will be found in Chapter XIII. of Part I. (page 163).

Dr. Shrubsall was good enough to show me over this institution and to afford me information relative to its work.

THE ROYAL HOSPITAL FOR DISEASES OF THE CHEST,
CITY ROAD, LONDON.

(Founded 1814.)

This hospital, which was the first of its kind in Europe and has now carried on its work for nearly a century, is situated on the north of the City Road between Regent and Windsor Streets and a short distance to the east of the City Road Basin of the North Metropolitan Canal.

The position which the institution occupies is relatively speaking an open one, there being an extensive area to the north of the City Road hereabouts upon which there are no high buildings to obstruct the light or air.

The original structure was rebuilt in 1865, a new wing for out-patients having been added in 1876-77 and another wing for in-patients in 1884-86.

New wards were opened in 1893 and balconies for the open air treatment were erected in 1904.

In 1905 a new Nurses Home abutting upon Regent Street was erected and a sanitary tower added to the hospital itself.

This Home comprises 25 separate bedrooms with adequate bath-room and lavatory accommodation, two sitting-rooms and a sick ward with kitchen attached.

In 1906 various improvements were carried out comprising better quarters for the Resident Medical Officer and for the servants, and the installation of electric light throughout the institution.

The existing accommodation comprises 80 beds in three wards, one for 30 females and two for 26 and 24 males respectively.

During 1906 arrangements were made by which those persons suffering from pulmonary tuberculosis were separated from those suffering from other diseases of the chest, the tuberculosis cases numbering only about 50 per cent. of the total admissions.

The cubic space allotted to each patient is rather over 1,000 cubic feet.

The open-air balconies which were erected in 1904 have been much appreciated by the consumptive patients, some of whom have materially improved when placed in this position.

The committee of management is, I understand from Mr. May, the Secretary, very anxious to procure the erection of a sanatorium in connection with the hospital, but at present there are no funds available for the purpose.

In the meantime, Dr. Pringle, the Resident Medical Officer, states that the hospital committee is able to obtain beds at one or other of the existing sanatoria for some 30 per cent. of those in-patients who are suffering from pulmonary tuberculosis.

THE FREE HOME FOR THE DYING.

(Founded in 1891.)

This institution, which is situated at 29, North Side, Clapham Common, S.W., is a free home in every sense, and the vast majority of the cases annually admitted are persons of either sex suffering from pulmonary tuberculosis or from cancer.

Miss Augusta Clifford is the Honorary Secretary and Dr. M. Mackintosh the Medical Officer.

FRIEDENHEIM HOSPITAL.

(Founded, 1885.)

The object of this institution which is situated in Upper Avenue Road, Swiss Cottage, N.W., is to provide the best of nursing and medical treatment for persons of either sex in the last stages of illness of various sorts whose circumstances prevent them from being properly cared for at home, and the nature of whose illness precludes their retention in the general hospitals.

Patients are admitted solely on their merits, preference being accorded to those who are not regarded as suitable for the workhouse infirmary. The general wards are free, but when patients or their friends can afford it, contributions are received varying from 2s. 6d. to 10s. weekly. A few beds in one of the wards are reserved for patients paying from one to two guineas a week.

A large proportion of the inmates are persons suffering from phthisis, phthisis and cancer being the two main diseases dealt with. Cases of phthisis during the last five years have formed over 50 per cent. of the total admissions, and during 1905 there were 107 cases of this disease under treatment. The total accommodation of the hospital is 48 beds.

Miss Helen Don is the Honorary Secretary and Dr. Percy Lush the Medical Officer.

HOME FOR CONSUMPTIVE FEMALES.

(Founded, 1863.)

This Home is situated at 57 and 58, Gloucester Place, Portman Square, W. where two houses have been united, and by structural alterations made to serve the purpose of a hospital. It provides for the *permanent* reception of respectable women suffering from

pulmonary tuberculosis, and who are without any available home. The institution also receives temporarily consumptive persons who are awaiting admission to Consumption Hospitals.

There are now 23 beds, and the staff consists, in addition to the Superintendent, of a nurse, a housemaid, and a cook.

The actual cost of maintenance per case is from 14s. to 14s. 6d. weekly, the difference between this cost and the payments of patients being made up from subscriptions, donations, and legacies.

Inmates are required to pay one guinea as an entrance fee, and 8s. per week, this sum including lodging, medical attendance, board and washing.

In the case of persons awaiting admission into a Consumption Hospital the entrance fee of one guinea may be remitted, and a weekly charge of 11s. made in place of 8s.

Some of the patients have been in the Home for many years, and one of them died recently after a residence of nearly forty years. At the date of my visit to the Institution in October 1906 there were six patients still occupying beds who had become inmates as far back as 1873, 1878, 1879, 1881, 1883, and 1886; all these patients having, I was informed by Miss Neil, the Superintendent, previously been inmates of Brompton Hospital for Consumption.

The Honorary Secretary is Mrs. Walrond, and applications for admission are made to her at her residence, 13 Chester Square, S.W., or to the Superintendent at the Home itself.

HOSPITAL OF ST. JOHN AND ST. ELIZABETH.

(Founded, 1856.)

The present situation of this institution is at 40, Grove End Road, St. John's Wood, N.W., the hospital which was originally established in Great Ormond Street having been removed to its present position in 1898.

It is intended not for incurable phthisis patients but for persons of both sexes suffering from illness of one or another description, and who require long continued medical treatment and nursing. A very large number of the patients admitted having already been under treatment at some general or special hospital.

There is one ward of 17 beds set apart for the open-air treatment of female patients suffering from pulmonary tuberculosis: the financial position of the hospital does not allow a ward for male consumptive patients to be opened at present.

There are some private rooms for patients at a charge of from four guineas weekly.

MARGARET STREET HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST (FOR OUT-PATIENTS ONLY).

(Opened, 1847).

This institution, which commenced its existence in 1841 as an out-patient department in Great Marlborough Street, eventually became the "Hospital for Consumption," at 26, Margaret Street, W., which now comprises an out-patients' department in London and a Convalescent Home at Fairlight Hall, near Hastings.

During 1905 there were 1,631 out-patients at 26, Margaret Street, as compared with 1,450 in 1904.

THE MOUNT VERNON HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST, HAMPSTEAD BRANCH.

This Institution, which was founded as far back as 1860, is situated on the Bagshot Sands at Hampstead, at an elevation of 385 feet above Ordnance Datum, a position which commands extensive views and affords the patient an abundant supply of air.

The Hospital has recently been enlarged by the addition of an eastern wing, and at the present time affords accommodation for 140 patients, exclusive, it is important to note, of the 100 beds in the Country Hospital at Northwood in Middlesex. Recently, the building has been materially modified in the direction of rendering it more suitable for "open-air" treatment; there are now three balconies on the south-west aspect of the institution, *i.e.*, one on the ground floor for seven beds, another on the main floor for thirteen beds and a cot, and another on the first floor for the same number.

There are therefore 35 out of the 140 beds available always in the open air, and these beds are occupied both day and night.

The balconies are provided with folding glass shutters, but save in exceptionally severe weather these are not closed.

The class of cases accommodated on the balconies varies somewhat. In summer it is found by experience that advanced cases do well, but in winter—especially if the larynx is affected—the conditions are found rather too severe for some of the cases. In winter weather, therefore, earlier cases sleep on the balconies.

In addition to use of these 35 beds in the balconies, measures are adopted for applying the open-air treatment to practically four-fifths of the patients in the institution.

Arrangements are provided for electric baths and for other forms of electrical treatment, as also for X-ray examinations, and a well-equipped block for pathological research has recently been added.

Out-patient Department in Fitzroy Square.

This department, which has recently undergone substantial expansion and improvement, is now situated at 7, Fitzroy Square, N.W., where there is not only adequate provisions for out-patients but also for the medical staff and the secretarial department of the hospital.

This central out-patient department affords treatment for cases which cannot be received as in-patients; as also opportunity for the selection of suitable cases from the metropolis, either for the in-patient department at Mount Vernon or the country branch at Northwood. Similarly it enables patients who have been discharged from either of these last-named institutions to be kept under supervision.

Opportunities are also afforded at Fitzroy Square for lectures and demonstrations to medical practitioners and medical students. In this connection it deserves notice that during 1905 no fewer than 5,270 patients were treated there.

It may be pointed out that the hospital, as a whole, is a truly national institution; that it takes patients from all parts of the country, and that by means of medical referees, who are appointed at all important centres, facilities are afforded for the examination of applicants for admission and for the selection of suitable cases.

With this explanation I submit the tables for the past six years as taken from the Annual Reports for 1901-6 inclusive.

Results of the Treatment.

		Number.	Percentage.	
Year 1901.	Much improved	103	23.0	} 69.0 per cent.
	Improved	206	46.0	
	Slightly improved	79	17.6	
	Unimproved	33	7.4	
	Worse	22	4.9	
Total Cases under Open-air Treatment, 448.	Dead	5	1.1	
Year 1902.	Much improved	172	37.4	} 66.5 per cent.
	Improved	134	29.13	
	Slightly improved... ..	68	14.8	
	Unimproved	60	13.04	
	Worse	23	5.0	
Total Cases under Open-air Treatment, 460.	Dead	3	.63	



MOUNT VERNON HOSPITAL, HAMPSTEAD.
(South West Front.)

(To face page 418.)

—	—	Number.	Percentage.	—
Year 1903.	Much improved	203	41·6	{ 68·8 per cent.
	Improved	133	27·2	
Total Cases	Slightly improved...	88	18·0	
under Open-air	Unimproved	47	9·6	
Treatment,	Worse	16	3·2	
487.	Dead	12	2·4	
Year 1904.	Much improved	212	42·2	{ 66·4 per cent.
	Improved	121	24·2	
Total Cases	Slightly improved...	91	18·2	
under Open-air	Unimproved	34	6·8	
Treatment,	Worse	18	3·6	
500.	Dead	24	4·8	
Year 1905.	Much improved	176	38·1	{ 77·1 per cent.
	Improved	180	39·0	
Total Cases	Slightly improved...	45	9·7	
under Open-air	Unimproved	26	3·6	
Treatment,	Worse	12	2·6	
461.	Dead	22	4·7	
Year 1906.	Much improved	189	28·0	{ 59·6 per cent.
	Improved... ..	213	31·6	
Total Cases	Slightly improved...	130	19·3	
under Open-air	Unimproved	88	13·0	
Treatment,	Worse	31	4·6	
675.	Dead	24	3·6	

The following Table gives the figures for the years 1901–1905 combined.

Total Cases of Phthisis 2,368.

—	Number.	Percentage.
Much improved	866	36·4
Improved	774	33·1
Slightly improved...	371	15·6
Unimproved	200	8·4
Worse	91	3·8
Dead	66	2·7

As regards the value of early treatment the following figures are of interest.

Table showing the Percentage of Much Improved and Improved Cases, according to the number of lobes affected in 1,532 cases admitted, 1901-1905.

	Classification.	Number of Lobes Affected.			
		One Lobe.	Two Lobes.	Three Lobes.	Four Lobes.
1901-1905	Much improved	58·8	33·2	23·4	18·5
	Improved	31·5	33·4	43·2	40·7
	Total percentage of much improved and improved.	85·8	79·4	66·6	59·2

ST. JOSEPH'S HOSPITAL, CHISWICK.

(Founded, 1875.)

This institution, which provides accommodation for 48 women and children, was founded at Kensington by Sisters of St. Mary and St. John, but in 1897 it was removed to a new building standing in its own grounds in Burlington Lane, Chiswick.

Such cases are admitted as can pay a small sum towards their maintenance, and who are either incurable or suffering from a malady of too chronic a nature to be admitted or retained in general hospitals. A considerable number of the patients are suffering from pulmonary tuberculosis. The charge for women is £26 per annum, or 10s. 6d. per week, and for children under 12 years of age £13 per annum, or 5s. 6d. weekly.

Cases of cancer, consumption, or lupus are placed in special wards at 15s. per week.

All applications for admission are to be made to the Sister Superior at the Hospital.

ST. LUKE'S HOUSE.

This institution which is "a home for the dying poor" is situated at 12, Pembridge Square, Bayswater, and it provides accommodation for 28 patients. The main condition of



AN OPEN-AIR GALLERY AT HAMPSTEAD.

(To face page 420.)

admission is the circumstance that, so far as medical prognosis can foretell, the patient is in a condition which will probably end fatally within a few weeks or months. The nature of the malady from which the patient suffers is immaterial provided it be not "acutely infectious." Incurables and bed-ridden cases are not admitted unless the condition above referred to is also complied with.

The majority of the cases are males or females suffering from either tuberculosis or cancer. During 1905, out of 95 cases dealt with, 51 were suffering from some tuberculous disease, the greater number from pulmonary tuberculosis.

All applications are required to be addressed to the Hon. Sec., Miss Don, at the Home.

ST. PETER'S HOME, KILBURN.

This Home, which is one of several charitable institutions, including the Homes at Axbridge and Cheddar already mentioned, supported by the community of St. Peter, is situated in Mortimer Road, Kilburn. It provides accommodation "for long and hopeless cases, for acute cases, for ladies in poor circumstances, for children, and for the dying."

The following weekly charges are made: For ordinary cases 10s., for girls over twelve 7s., and for children 5s. 6d. For the ladies' cubicle ward from 15s. to 21s. I am informed by the Sister that there is a twelve bedded ward for consumptive patients, and that the charge for patients is 10s. per week, exclusive of the cost of stimulants and laundry.

THE CITY OF LONDON HOSPITAL FOR DISEASES OF THE CHEST.

(VICTORIA PARK HOSPITAL.)

(Founded 1851.)

This institution, which is the only consumption hospital in this part of London, is situated on a triangular piece of land some four acres in extent and but a short distance west of Victoria Park. The site is the property of the Crown. The hospital in its earliest form was established in 1848 as a dispensary in Liverpool Street, and was intended for the relief of persons who

were too poor to pay for medical assistance but who did not belong to the pauper class.

The demands made upon this institution were so great as to necessitate the erection of the present extensive hospital, which when built was, although accessible, "almost in the country." The foundation stone was laid by the Prince Consort on June 25, 1851, and the building was opened in 1855.

The hospital occupies a relatively open and quiet position, and provides, when in full working order, accommodation for 164 beds. Of these some 75 per cent. is devoted to the treatment of pulmonary tuberculosis, the remainder being utilised for other diseases of the chest.

Unfortunately want of funds has necessitated the closing of 24 of the beds, but efforts are being made to procure the necessary further support. The original building has been added to from time to time, and a well arranged nurses' home, providing accommodation for 41 sisters and nurses, has been recently erected at a cost of £9,000. This home was opened by their Royal Highnesses the Duke and Duchess of Connaught.

In order, too, that the open-air treatment might be duly carried out, spacious balconies were erected some five years ago in connection with the southern wing of the hospital, and certain patients who are unable to take advantage of the grounds in connection with the institution spend their time on these balconies. There are "shelters" in the grounds for both male and female patients.

Markedly better results have it is stated been obtained at this hospital since the introduction of the open-air treatment.

The hospital draws its cases from almost all parts of the Metropolis as well as from Essex, Kent, Middlesex, Herts, and other counties ; and it is supported solely by voluntary contributions. The working classes and several East End Philanthropic and Friendly Societies subscribe to the funds.

Lighting is at present by means of gas, but it is hoped eventually to instal electric light.

The cost of maintenance is 30s. per week per bed, and the average stay of in-patients is about 52 days.

There is a large out-patient department in connection with the hospital, and since the opening of the institution some 700,000 out-patients have been treated.

Admission for suitable cases is by means of letters of recommendation, which are obtained from the governors. Patients in an advanced stage of the disease are, according to the rules of the hospital, ineligible for admission.

Both the out-patient and in-patient letters continue in force for six weeks, and if further treatment is recommended, a fresh letter must be procured.

Persons in receipt of parish relief and the wives and children of such persons are ineligible for treatment.

I am indebted to Dr. Glover Lyon, one of the physicians, and to Mr. H. Dudley Ryder, the secretary, for kindly showing me over the hospital and affording me information relative to its work.

MOUNT VERNON HOSPITAL (COUNTRY BRANCH), NORTHWOOD, MIDDLESEX.

(Opened September, 1904.)

The Northwood Sanatorium forms, administratively, part of the Mount Vernon Hospital for Consumption and Diseases of the Chest, which consists, in addition to the sanatorium now under consideration, of a hospital at Hampstead, and an out-patient department, &c., at 7, Fitzroy Square. The sanatorium itself, which has been erected at a cost of over £100,000, solely by the munificence of a donor who elects to remain anonymous, is situated near Batchworth Heath, Northwood, Middlesex.

The site consists of 104 acres of park land of considerable attractiveness. It is in parts richly wooded, and has an elevation of some 375 feet above Ordnance Datum. From the sanatorium an extensive panorama is obtained, it being possible on a clear day to discern the Surrey Downs, Windsor Castle and other notable and distant landmarks.

The building, the foundation stone of which was laid by Her Royal Highness Princess Christian, Patron of the Hospital, on May 13th, 1902, is a well designed two-storied structure, situated on the sands and gravels of the Woolwich beds. The general arrangement of the several blocks of which it is composed may be seen by reference to the accompanying plan.

The sanatorium proper, consisting of a central block and two wings faces generally southward, certain administrative buildings extending northward from its centre.

The eastern and western wings of the sanatorium provide accommodation for the patients : one side for 50 males, the other for 50 females ; some of the wards being large, others for one patient only. The eastern wing has a south-south-west aspect, the western a south-south-east. The cubic space for each patient amounts to 1,400 feet.

In front of the sanatorium are two well arranged terraces, upon which the patients may take exercise, and on to the upper of which patients may be wheeled in their beds through

the double French casement windows with which each of the wards is provided. On the second-storey is an extensive balcony which is utilised in like manner for the patients on that floor. During the summer months patients sleep on these terraces.

The central block, which is composed of three storeys, comprises on the first and second floor quarters for the resident medical officer and the matron, the dispensary and consulting-rooms, the Board-room and library. The third-storey contains accommodation for 13 servants. The grounds themselves are sufficiently extensive and variable as regards gradient to allow of the exercise necessary for each patient being carried out within the limits of the estate.

At the free end of each wing of the sanatorium proper is a capacious winter garden of glass, affording ample light and air for patients in stormy weather.

Behind the wards and running the whole length of the eastern and western wings is a well-lighted corridor, ten feet wide, and eleven feet high, the windows of the inner walls of the wards and of the outer walls of the corridor being so arranged that, at will, complete perfilation of air can be procured through the wards and corridors.

Extending backwards, *i.e.*, northwards, from each wing there are two annexes providing lavatory and bathroom accommodation, while near the free end of each wing is an isolation block fitted with separate kitchen and lavatory accommodation, for the isolation of patients suffering from the more acutely infectious diseases. These blocks have already proved of use.

The residence of the hon. physician-in-charge, the patients' dining-room (with accommodation for 250 persons), and the Nurses' Home, where accommodation is provided for 20 nurses, as also the kitchens, are situated on the west and east sides of the corridor, which runs north towards the laundry and electric station.

The laundry, which is of sufficient size to deal with the linen, &c., of 400 patients, and where the washing, both from Hampstead and Northwood, is carried out, is provided with all the latest improvements, while in a separate building is a Washington Lyons disinfecting apparatus, and near at hand an incinerator for the complete destruction of waste material and sputum.

Water is procured at a depth of upwards of 500 feet from a well on the estate which is sunk through the tertiary beds and the underlying chalk into the upper greensand, the water being pumped up into tanks and supplied partly softened and partly in its natural state to various parts of the institution.

Lighting is by means of electric light, generated on the estate, and supplied in most liberal fashion to all parts of the institution, inclusive of the chapel referred to later.



NORTHWOOD SANATORIUM.

(To face page 424.)

Warming is by open grates. The Langfield system of hot air ventilation is employed in the central administrative block, the nurses' room, and the chapel. There is a complete system for the prevention of fire.

The promotion of scientific research is provided for in a spacious pathological laboratory, furnished with modern apparatus for histological, chemical, bacteriological and photographic examinations, while leading out from this pathological laboratory is a thoroughly equipped autopsy chamber.

There is a well-arranged dispensary, and also an X-ray installation.

A capacious ambulance is kept in the stables for use in bringing the patients from Hampstead to the country hospital at Northwood, this provision having been made to allay local prejudice and to render it unnecessary for the patients to travel by rail.

There is a picturesque Hospital Chapel erected in the grounds, where services are conducted by the chaplain, who attends regularly. Here, again, local prejudice has been met by the provision of a separate entrance, and separate accommodation for visitors, who are attending the services in increasing numbers. The members of the staff of all ranks sit, however, behind the patients in the body of the chapel.

Dr. T. N. Kelynack, one of the Honorary Physicians to Mount Vernon Hospital, at the special request of the Committee and Medical Board, was until recently residing with his wife at the Hospital at Northwood as Honorary Physician-in-Charge, in order that the administration of the institution might be started on thoroughly sound lines. There is also a Resident Medical Officer; and one member of the Honorary Staff visits weekly. At the date of my visit to Northwood I was able to confer not only with Dr. Kelynack but also with the Chairman of the Hospital (Mr. Henry Stedall) and the Secretary, Mr. W. J. Morton. To the latter I am indebted for valuable notes relative to the institution and for permission to reproduce the accompanying illustrations.

Conditions of Admission.

Patients are admitted to Northwood on the advice of the Medical Staff of Mount Vernon Hospital and every endeavour is made to procure early cases. At the time of my visit no contributions were being made by District Councils or Boards of Guardians, though contributions have in the past been received from the Bristol* and other Boards of Guardians for the maintenance of patients sent in by them. The Committee of the Sanatorium is, I understand, willing to accept contributions from local authorities at the rate of £75 per annum per bed, and

* The City of Bristol now supports 20 beds at the Winsley Sanatorium near Bath (see page 516).

Mr. Morton has, he tells me, invited the various District Councils and Boards of Guardians in the county of Middlesex to subscribe for beds at this rate, such beds to be kept for the use of consumptive patients nominated by these subscribing authorities.

I see, too, by the last annual report (1905), that amongst the public bodies subscribing to the fund common to Mount Vernon and Northwood were the following :—

Ealing Urban District Council.
The Corporation of London.
Chelmsford Board of Guardians.
Hampstead " "
Lambeth " "
Watford " "
Willesden " "
Hammersmith " "

Dr. Kelynack has introduced simple, but very serviceable, charts for the scientific record of every case. Careful notes are taken in all cases, and it is hoped that the data thus collected will afford valuable help in arriving at reliable conclusions in regard to the management of consumptives.

At Northwood the sexes are kept practically quite apart by devoting one wing of the Institution to males and the other to females, and by arranging the walks in such fashion that there shall be no co-mingling of the sexes during exercise.

A useful system whereby the maintenance of proper discipline and tone amongst the patients is facilitated has been initiated by Dr. Kelynack. In the male wing a chairman, and in the female wing a chairwoman, is appointed from among the patients, who is responsible, generally, for the discipline of the patients under his or her charge; and all orders or directions to the patients are, so far as may be expedient, conveyed to them by these sub-officers. It is found that in this way the best principles of public life can be introduced into the institution.

Patients on admission are as a matter of routine kept in bed for the first few days.

Every effort is made to arrange the patients' day in a methodical manner,* while at the same time avoiding vexatious directions, and it is found that the classification of the patients is materially facilitated by the provision of separate tables in the dining hall.

As regards the important question of work, Dr. Kelynack is, he tells me, endeavouring to introduce a system by means of

* The daily routine is as follows :—

7.0 a.m. Rise, wash and dress.	10.30 a.m. Exercise or Work.	4.0 p.m. Rest.
7.30 a.m. Rest.	12.0 Noon Rest.	4.30 " Tea.
8.0 " Breakfast.	12.30 p.m. Dinner.	5.0 " Rest.
8.30 " Rest.	1.30 " Rest.	6.0 " Recreation
9.0 " Work.	2.0 " Exercise or work.	hour.
10.0 " Lunch.		7.0 " Supper.
		8.0 " In bed.

which such [patients as give promise of being able to return to the ranks of the workers shall be gradually accustomed while within the hospital to increasing amounts of work, so that they may not on their discharge undergo relapse owing to too sudden change of habits and environment. All patients are encouraged to assist in light work according to their strength, and shortly before discharge efforts are made to secure them occupations which will reduce to a minimum the chances of relapse.

Concerts and organ recitals, &c., are held frequently, and every effort is made to maintain the patients in a healthy state of mind. Visitors are allowed on Thursdays and Sundays.

The nurses and probationers attend a well arranged course of lectures; and by way of detecting any signs of ill-health among the staff, every member thereof is periodically subjected to medical examination by the Hon. Physician-in-Charge.

Results of the Treatment.

It is the practice of this institution (and also at the Mount Vernon Hospital) to avoid entirely the use of the word "Cured," in relation to the condition of patients discharged from the Hospital. "Much improved" includes those patients who have made most progress, some of them being on the high road to complete recovery, and leaving the Hospital without any symptoms or physical signs of disease; and others, who from the extent of their lesion would not be expected to become quiescent in so short a time, yet have made very good progress. "Improved" signifies that the patients included under this heading have made distinct all-round improvement.

The annual reports for 1905 and 1906 contain some instructive data, and the accompanying tables relative thereto will be self-explanatory.

As regards the extent of lung involvement on admission the following figures are furnished :—

—	—	One Lobe.	Two Lobes.	Three Lobes.	Four Lobes.	Five Lobes.
1905 ...	Males	28.8	19.6	14.8	12.6	23.1
	Females	35.7	31.4	19.5	3.8	9.0
	Totals	32.1	25.2	17.0	8.4	16.4
1906 ...	Males	37.6	25.2	12.3	11.06	13.7
	Females	39.8	29.5	15.5	9.8	5.1
	Totals	38.6	27.2	13.8	10.5	9.7

Table as regards Stage of Disease in Febrile Cases.

—	—	No. of Cases.	Early.	Chronic.	Cavitation.
1905 ...	Males ...	75	14.6	65.3	20.0
	Females ...	67	14.9	74.6	10.4
	Totals ...	142	14.7	69.7	15.4
1906 ...	Males ...	43	25.5	48.8	25.5
	Females ...	32	15.6	62.5	21.8
	Totals ...	75	21.3	54.6	24.0

Stage of Disease in Non-febrile Cases.

—	—	No. of Cases.	Early.	Chronic.	Cavitation.
1905 ...	Males ...	154	25.9	61.6	12.3
	Females ...	143	37.7	53.1	9.0
	Totals ...	297	31.6	57.9	10.7
1906 ...	Males ...	183	47.5	38.2	14.2
	Females ...	161	42.8	45.9	11.1
	Totals ...	344	45.3	41.8	12.7

With reference to the presence or absence of expectoration, and of tubercle bacilli, sputum was obtainable in 1905 in 394 out of 439 cases, and on bacteriological examination, repeatedly in some instances, tubercle bacilli were found in 64 per cent. of the 394 cases which yielded sputum.

During 1906 there was expectoration in over 78 per cent. of 419 tuberculous cases, and bacilli were present in over 48 per cent. of the cases having sputum.

Tubercle bacilli were present in over 53.5 per cent. of the male cases, and in nearly 42.5 per cent. of the female.

Results.

In considering the results a differentiation has, as far as practicable, been made between *general* and *local* improvement, a distinction which is important owing to the well-known fact that even with material constitutional progress the local lung mischief not infrequently advances. During 1905 while several patients, the subjects of widespread disease, so far improved as to be able

to take up suitable employment, others with early or limited lesions failed to react to treatment and went from bad to worse.

The following tables give the *general* and *local* results for each of the years 1905 and 1906, and it will be observed that the term "cured" is not used, the compilers of the tables being of opinion that the use of this term is unjustifiable in the absence of the time and work test.

General Results.

—	Sex.	No. of Cases.	Much Improved.	Improved.	Unchanged.	Worse.	Dead.
1905	Males...	229	43.2	45.4	8.2	1.3	1.7
	Females	210	55.2	40.4	3.8	—	0.4
	Totals	439	48.9	43.0	6.1	0.6	1.1
1906	Males...	226	39.8	43.4	13.7	2.2	.44
	Females	193	47.1	43.5	8.8	.51	.0
	Totals	419	43.1	43.6	11.4	1.4	.23

Local Results.

—	Sex.	No. of Cases.	Arrest.	Much Improved.	Improved.	Unchanged.	Worse.
1905	Males...	229	24.0	15.7	31.4	22.7	6.1
	Females	210	35.7	15.7	26.1	20.4	1.9
	Totals	439	29.6	15.7	28.9	21.8	4.1
			45.3				
1906	Males...	226	15.04	19.4	42.4	19.03	3.5
	Females	193	14.5	28.4	37.8	15.02	4.1
	Totals	419	14.7	23.6	40.3	17.1	3.8
			38.3				

As regards the "unchanged" group it is observed in the annual report for 1906 that many of these cases were sent on from Mount Vernon as "convalescents," in whom the conditions "arrest" or "much improved" had already been attained.

As regards "after-care" the annual report states that a considerable number of patients have from time to time sent reports as to their condition, and that many old patients are known to be doing well. There is, too, it is stated, evidence to the effect that the educational work of the institution is far-reaching.

THE CHILDREN'S SANATORIUM FOR THE TREATMENT OF PHTHISIS.

(Opened August, 1906.)

This institution, which is for pulmonary tuberculosis alone, is situated amongst pine trees and in close proximity to the sea at Holt in Norfolk, where a site for a permanent building has recently been acquired. Pending the erection of this building accommodation for 15 patients is provided in a newly erected house adjoining the site. Dr. Burton-Fanning is the Honorary Consulting Physician and Dr. J. B. Gillam the Medical Officer.

Girls from 2 to 16 and boys from 2 to 7 years of age, and who are suffering from early phthisis, are admitted.

The Invalid Children's Aid Association provides for the investigation and medical inspection of all cases prior to admission, and it also maintains in the metropolis a system of after-care with regard to the children discharged.

The weekly charge made in each case depends upon the philanthropic support which the institution is receiving, but of the 21 cases admitted up to the date of the first report 15 paid 7s. 6d., 5 paid 15s., and one was admitted free.

The report of Dr. Gillam for the 12 months ended August, 1907, is an encouraging one, and the general inferences drawn are—

1. The necessity for very early treatment.
2. That in all stages except the very advanced, improvement takes place up to a certain point; proving that the treatment is on the right lines.
3. That it is eminently desirable that children should *as far as possible* be placed under similar conditions at home after leaving the sanatorium.

Dr. Gillam points out that the method of treatment is an extremely simple one, and consists in providing those things which are generally absent in the home life of the children, *i.e.*, rest, good food, with abundance of milk and butter, continual fresh air, absolute cleanliness and limited exercise, together with supervision of treatment and careful watching of progress. He

also draws attention to the fact that the gain in weight in advanced cases is greater than in earlier cases owing to the initial emaciation of the advanced cases.

Particulars with regard to the institution can be obtained from Thomas H. Wyatt, Esq., M.V.O., the Honorary Secretary, at 68, Denison House, Vauxhall Bridge Road, Victoria, S.W., who has kindly furnished me with information relative to the institution.

KELLING SANATORIUM, NORFOLK.

(Opened 1902.)

This institution is of exceptional interest, in that it illustrates important developments in the erection of temporary buildings contrived with special regard to economy and to the supply of abundant fresh air.

For information with regard to this sanatorium I am indebted to Dr. Burton-Fanning, of Norwich, to whose initiation and organisation the institution is due, and to Dr. W. J. Fanning, the Resident Medical Officer, as also to the late Mr. Lucas D'Oyly Carte, who, although an invalid himself, devoted gratuitously the whole of his energies to the institution for many years.

The sanatorium is founded and carried on upon charitable lines, and is intended for persons unable to pay the fees commonly current at private institutions.

The site consists of about 20 acres of land in an open and bracing situation a mile to the east of Holt, in Norfolk. Some shelter is afforded on the north, east, and west by woods. The nucleus of the institution consisted of an already existing house, which in the first instance was so altered as to afford accommodation for 10 patients and the necessary staff. Later the demands upon the beds and the support which the institution received, justified substantial additions to the accommodation, so that the number of beds at the sanatorium has now reached 51, including provision for 16 female patients in the Women's Wing opened in January, 1906. A chapel has been recently added.

Of the 51 beds 8 are occupied by working patients, 16 by women, and 27 by men.

The institution now consists of—

- (1.) A two-storied administration house, which also affords accommodation for a certain number of the patients, and which comprises consulting room, matron's room, servants' hall, dining room, &c.

- (2.) Three one-storey pavilions, extending to the west and to the north of the administration building, and which will be described in more detail.
- (3.) A medical superintendent's house.
- (4.) Other outbuildings.

The arrangement on the site of these several buildings will be seen from the accompanying sketch, for permission to reproduce which I am indebted to Dr. Burton-Fanning.

What may be termed the special features of this institution are the two pavilions, which extend in a westerly direction at right angles to the administration building, and each of which provides accommodation for 11 patients and one nurse.

Each of these pavilions comprises four double-bedded night shelters, or cubicles, separated by dwarf partitions about six feet high; and in addition three separate wards, a lavatory, two bath-rooms, a nurse's bed-sitting room, and a kitchen furnished with a sink and with a small stove for heating milk. Each two-bedded cubicle measures 12 feet by 11 feet by 7 feet 3 inches, *i.e.*, the cubic space per bed is under 500 feet, and there is a doorway on each free side measuring 4 feet in width and reaching to the roof, which can be closed by folding half-hatch doors, the upper parts of which are glazed. By this means complete privacy can be secured when necessary and the amount of air to be admitted duly regulated.

It may be added that in each pavilion there is an un-closable ventilating air-space three inches deep extending along both sides of the building immediately *under* the ceiling; a similar ventilating slit *above* the ceiling and under the wall-plate which serves to keep the roof and ceiling cool in summer.

The floor space in each instance is as limited as the requirements of the bed and the necessary furniture will allow, the building being merely sufficient to permit of the necessary privacy and protection from storm.

The notable feature of these pavilions is that while they are as accessible and convenient for service, cleansing, &c., as a ward, each cubicle in them has the complete command and supply of fresh air usually obtained in an isolated sleeping chalet.

Each patient has a double cupboard at the foot of his bed, and in the lavatory is a locker for storing the rug used by the patient in the day shelters.

Around each pavilion there is a concrete path, sheltered from the rain by the projecting eaves of the roof, and thus affording shelter to the nurse as she visits the patients.

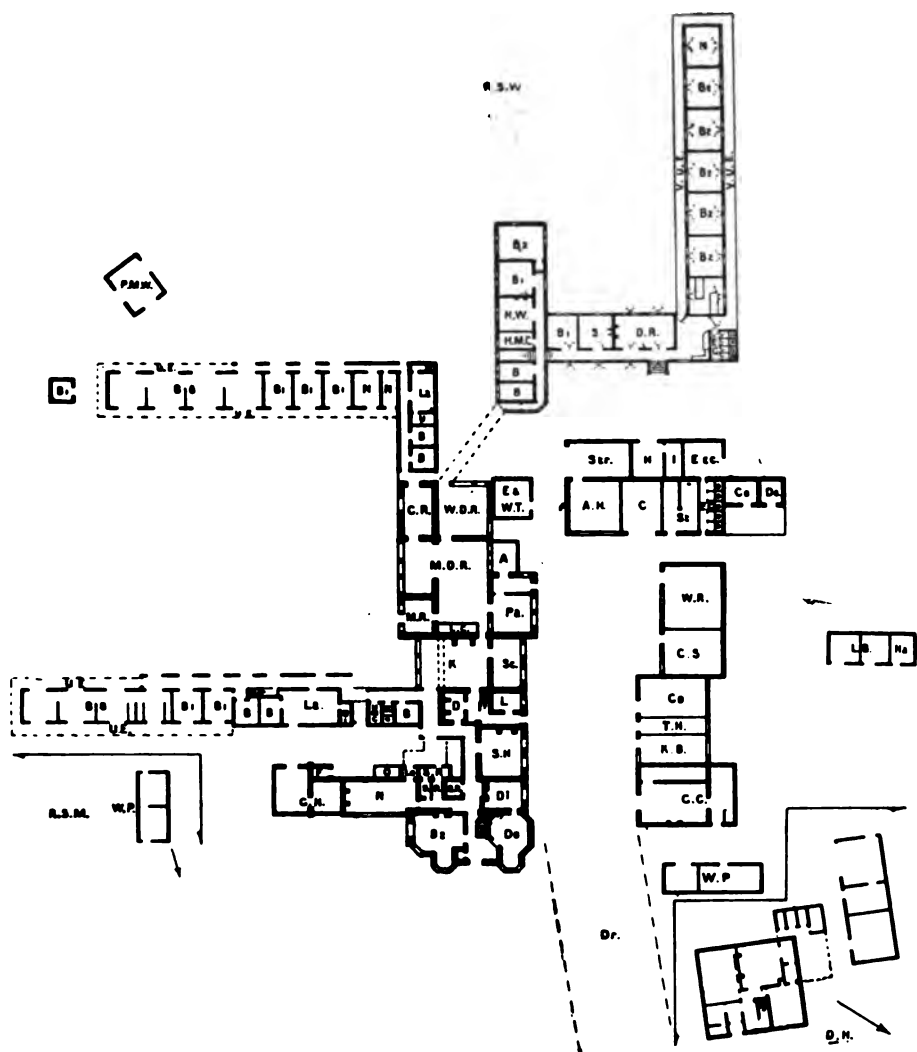
"The walls are constructed of 2½-inch 'Mack' fireproof slabs, finished on the outside with cement rough-cast, the walls being only about 3½ inches thick when finished. The roofs are covered with Major's double Roman



GENERAL VIEW OF KELLING SANATORIUM.

(To face page 432.)

PLAN OF KELLING SANATORIUM, PREPARED BY DR. W. J. FANNING.



A. Airing Room.
 A.H. Acetylene House.
 B. Bath.
 B1 } Bedrooms { 1 bed.
 B2 } { 2 beds.
 B8 } { 8 "
 C Coach House.
 Co. Coal.
 C.R. Cloak Room.
 C.S. Carpenter's Shop.
 D Dairy.
 De Destructor.
 Di Dispensary.
 Do Doctor.
 Dr Drive.
 D.H. Doctor's House.
 D.R. Day Room.
 E.E.C. Earth for E. C.
 E.C. Earth Closets.
 E.W.T. Engine and Water Tower.

F. Furnace.
 G.C. Gardener's Cottage.
 G.H. Green Houses.
 H Hay.
 Ha Harness.
 H.W. Hot Water.
 I Incubator.
 K Kitchen.
 K.B. Knives and Boots.
 L Larder.
 La Lavatory.
 Lo Lobby.
 L.B. Loose Box.
 L.C. Linen Cupboard.
 M.D.B. Men's Dining Room.
 M.R. Milk Room.
 N Nurses.
 O Oil Room.
 Pa Pantry.
 P.M.W. Poultry Men's Work Room.

R.S.M. 14 Revolving Shelters for Men.
 R.S.W. 7 Revolving Shelters for Women.
 S Sister.
 Sc Scullery.
 St Stables.
 Str Straw.
 S.H. Servants' Hall.
 S.R. Store Room.
 T.H. Tool House.
 U Urinals.
 U.E. Under Eaves.
 V.U.E. Verandah under Eaves.
 W.P. Working Patients.
 W.R. Work Room.
 W.D.B. Women's Dining Room.

tiles. The ceilings are constructed of "Mack" slabs, and the whole of the inside is finished with quick-setting plastic material, and the floors are of jointless "Mack" flooring, coloured red. The walls, ceilings and floors have thus a continuous and jointless surface. The inside of the walls and ceiling is covered with Hall's sanitary distemper, and all woodwork has two coats of Carbolineum."

The cost of buildings of the above class must needs be of considerable interest to bodies, or persons, contemplating provision of sanatoria. In this particular instance the Committee, before proceeding by extension of this establishment in the sense now in question, procured estimates of cost from two sources. One such estimate contemplated timber frame, matchboard-lined walls and a tiled roof; the other assumed materials of the sort finally adopted. The latter it was felt would possess the advantage of being fireproof, while involving no greater cost than a building constructed of timber.

The cost of erecting the two pavilions, inclusive of the drainage and the hot and cold water supply, amounted to £1,300, or £59 per bed; a sum, however, which does not include the cost of the site of the original administrative building, &c., or of the doctor's house (£630). Taking the total expenditure on the whole institution, including the 16 beds for females, the cost per bed works out at about £200.

The water supply is derived from a deep well on the estate, a gas engine being used to pump the water into the water tower.

Excrement disposal is by means of earth closets, and the slop water is piped to two cesspits in the adjacent woods, from which it is pumped on to land.

Acetylene gas is used for illuminating purposes and is regarded as satisfactory.

Results of the First Year's Work.

According to the first annual report, there were during the year ended December 31st, 1903, 54 patients discharged from the institution, most of whom had derived much benefit from the treatment.

As to this the report states :—

"That so large a number has been restored to working capacity is chiefly due to the fact that a considerable portion of the cases were in an early stage of the disease, and we would urge most strongly on those who send patients that the most profitable results can only be obtained by admitting those in whom the disease is in an early stage and whose constitution has not been undermined and weakened. Improvement, no doubt, has been obtained in some of the more advanced cases, but, as must unfortunately happen in

the homes of the poor, the surroundings are often so unsuitable that in them patients' relapse frequently occurs."

The facts relative to the 54 patients discharged during the year in question are thus tabulated in the annual report:—

TABLE A.

The condition of the 54 patients on admission.

Febrile Cases.			Non-febrile Cases.		
Advanced Disease.	Slight Disease.	Total.	Long-standing Disease.	Recent Disease.	Total.
10 or 18·52 per cent.	4 or 7·40 per cent.	14 or 25·92 per cent.	19 or 35·18 per cent.	21 or 38·89 per cent.	40 or 74·07 per cent.

And as to these details the comment is made:—

"That 25 cases (or 46·29 per cent.) had either slight disease with fever or had recent disease without fever, and thus could be regarded as favourable, while 19 cases (or 35·18 per cent.) were of long standing and probably had undergone a certain amount of repair before they were admitted. The remaining ten cases (or 18·52 per cent.) were in an advanced state of the disease and were therefore not likely to do well."

TABLE B.

The condition of the 54 patients on discharge.

Fit for Work.	Fit for Light Work.	Improvement.	No Improvement.	Retrogression.
26 or 48·15 per cent.	12 or 22·22 per cent.	7 or 12·96 per cent.	3 or 5·55 per cent.	6 or 11·11 per cent.

It is very important, in so far as the economic aspect of the results is concerned, to note that—

"The term 'fit for work' as used in this table means that the patients are fit to do selected work which can be performed under suitable conditions, and their power of maintaining this fitness depends largely upon the extent to which they can find work under favourable conditions."



REVOLVING SHELTERS USED DURING DAY-TIME BY CONVALESCENT PATIENTS AT THE KELLING SANATORIUM.
In the background cheaply constructed cubicles in which patients, whether in the acute or convalescent stage of the disease, sleep.
(Reproduced by permission of Messrs. Cassell & Co., from Dr. Burton-Fanning's "Open-Air Treatment of Pulmonary Tuberculosis.")

(To face page 434.)



INTERIOR OF CUBICLE AT KELLING.

Showing the manner in which the open doors on either side of the cubicle referred to in preceding illustration allow of the thorough perfilation of air. (Reproduced from the same source as the previous diagram.)

(To follow plate facing page 434.)

TABLE C.

The after-history of the 54 cases as given in the first annual report.

—	On Discharge.	Condition Maintained.	Relapsed but Living.	Dead.
Fit for work ...	26	26 or 100 per cent.		
Fit for light work...	12	12 or 100 per cent.		
Improvement ...	7	4 or 57·14 per cent.	3 or 42·86 per cent.	
No improvement ...	3	2 or 66·66 per cent.	—	1 or 33·33 per cent.
Retrogression ...	6	3 or 50·00 per cent.	—	3 or 50·00 per cent.

Apparently these figures relate to the condition of the patients at a date only nine months after the first of them had left the institution, so that the interval as regards the later discharged cases would be but a few weeks. And accordingly Dr. Burton-Fanning and Dr. W. J. Fanning observe that the figures, though very encouraging, have not the value which those collected later and in relation to the same group of cases would possess.

The average duration of treatment of the 54 cases was 12 weeks. The longest stay was 41 weeks, the shortest two weeks.

The Second Annual Report gives the condition of the 54 patients at intervals of from 12 to 21 months from the date of their discharge from the sanatorium :—

TABLE D.

—	On Discharge.	Maintained Condition.	Relapsed but Living.	Dead.	No History.
Fit for work ...	26	19 or 73·08 per cent.	5 or 19·23 per cent.	1 or 3·84 per cent.	1 or 3·84 per cent.
Fit for light work	12	7 or 58·33 per cent.	3 or 25·00 per cent.	1 or 8·33 per cent.	1 or 8·33 per cent.
Improvement ...	7	1 or 14·28 per cent.	3 or 42·85 per cent.	2 or 28·59 per cent.	1 or 14·28 per cent.
No improvement	3	—	—	3 or 100·00 per cent.	
Retrogression ...	6	—	—	6 or 100·00 per cent.	

Result of the Second Year's Work.

During the year 1904 there were discharged from the institution 136 patients, the facts in regard of whom on admission were as follows :—

TABLE E.

Febrile Cases.			Non-febrile Cases.		
Advanced Disease.	Slight Disease.	Total.	Long-standing Disease.	Recent Disease.	Total.
28 or 20·58 per cent.	19 or 13·97 per cent.	47 or 34·55 per cent.	33 or 24·26 per cent.	56 or 41·18 per cent.	89 or 65·44 per cent.

The second annual report states that of the above cases the 19 febrile cases with slight disease and the 56 non-febrile cases with recent disease (making 75 or 55·13 per cent. in all) could be regarded as favourable. The 33 or 24·26 per cent. long standing non-febrile cases had probably, the report adds, undergone some amount of repair before admission, while the remaining 28 or 20·58 per cent. were too advanced to hold out much promise of restoration to even comparative health.

The conditions of these 136 patients on discharge were as follows :—

TABLE F.

Fit for Work.	Fit for Light Work.	Improvement.	No Improvement.	Retrogression.
51 or 37·50 per cent.	51 or 37·50 per cent.	17 or 12·50 per cent.	8 or 5·88 per cent.	9 or 6·62 per cent.

These figures, which show 75 per cent. as fit for work of some sort, are more satisfactory than the figures for 1903 with only 70·37 per cent. in that condition. This improvement has followed in point of time the adoption of the sleeping cubicles where the patients enjoy a much freer supply of fresh air at all times than was possible under the conditions which obtained in 1903. Contention that the improvement may have been due to the admittance of more promising patients is met by the statement that the figures for 1904 embrace a number of patients with advanced disease who were admitted for educational purposes only.

The following table shows the after-history of the 136 cases, but, as already said, it has to be borne in mind that many of

these patients had only been discharged from the institution for a short time when the after-history census was made :—

TABLE G.

—	On Dis-charge.	Condition Maintained.	Relapsed but Living.	Dead.	No History.
Fit for work ...	51	42 or 82·35 per cent.	7 or 13·72 per cent.	—	2 or 3·92 per cent.
Fit for light work	51	35 or 68·62 per cent.	14 or 27·45 per cent.	1 or 1·96 per cent.	1 or 1·96 per cent.
Improvement ...	17	9 or 52·94 per cent.	4 or 23·53 per cent.	4 or 23·53 per cent.	
No improvement	8	6 or 75·00 per cent.	—	2 or 25·00 per cent.	
Retrogression ...	9	3 or 33·33 per cent.	—	6 or 66·66 per cent.	

As regards this table, the following comment is made in the second annual report :—

“The comparatively large number of those classified as fit for light work who have relapsed, is probably due to their having been obliged to do harder work than they were fitted to perform, and as this is a difficulty which must always be expected in dealing with the class of patients who pass through the sanatorium it is not altogether surprising that some should have failed to maintain their working capacity. Stress of circumstances and the necessity of accepting any work which may be obtainable, often in most unsuitable surroundings, must have a harmful effect, and lead to much disappointment to those who have helped patients to meet the expense of sanatorium treatment. This seems to emphasise the experience that the healing effect of sanatorium life, unless supplemented by subsequent care and help, is often thrown away.”

The average duration of treatment of the 136 was 11·80 weeks, and the average gain in weight of those (128) who improved in this respect was 10·73 lbs.

Result of the Third Year's Work.

During 1905 there were 140 patients admitted, and these added to the 35 in the sanatorium on December 31st, 1904, give 175 as the total number under treatment during the year. It is, however, necessary to observe that at the end of December, 1904, the patients were grouped into two classes; persons—the larger number—under full treatment; and persons who, having passed through a period of full treatment, remained as “working patients” in order that their health might be preserved until they were able to find more suitable employment elsewhere.

The following table shows the number falling into each group :—

	Patients.	Working Patients.
In sanatorium on December 31st, 1904	35	4
Admitted during 1905	140	13
Discharged during 1905	175 150	17 11
In sanatorium December 31st, 1905	25	6

The condition of the 150 patients discharged during 1905 was, on admission, as follows :—

TABLE H.

Febrile Cases.			Non-febrile Cases.		
Advanced Disease.	Slight Disease.	Total.	Long-standing Disease.	Recent Disease.	Total.
32 or 21·33 per cent.	23 or 15·33 per cent.	55 or 36·66 per cent.	42 or 28·00 per cent.	53 or 35·33 per cent.	95 or 63·33 per cent.

As regards this table the annual report observes :—

Of the above patients 23 febrile cases with slight disease and 53 non-febrile cases of recent invasion, i.e., 76, or 56·66 per cent., were really suitable cases for sanatorium treatment such as we should aim at selecting ; and in the next table, which shows the condition of the 150 patients at the time of their discharge, it is seen that 57 were fit for work, by far the greater number of whom were drawn from these strictly selected cases. It is our object to get patients at the very commencement of their illness, before the great inroads have been made in their recuperative powers, and though much remains to be done in this direction there are hopeful indications that a better appreciation of this fact is gaining ground.

Table showing condition of 150 patients at time of their discharge :—

TABLE I.

Fit for Work.	Fit for Light Work.	Improvement.	No Improvement.	Retrogression.
57 or 38·00 per cent.	33 or 22·33 per cent.	35 or 23·33 per cent.	11 or 7·33 per cent.	12 or 8·00 per cent.

TABLE J.
SHOWING HISTORY of the 1905 PATIENTS from the time of
their DISCHARGE up to December 31st, 1905.

—	On Discharge.	Main- tained Condition.	Relapsed but Living.	Dead.	No History.
Fit for work ...	57	49 or 85·96 per cent.	7 or 12·28 per cent.	—	1 or 1·75 per cent.
Fit for light work.	35	25 or 71·43 per cent.	9 or 25·71 per cent.	—	1 or 2·85 per cent.
Improvement ...	35	17 or 48·57 per cent.	9 or 25·71 per cent.	9 or 25·71 per cent.	—
No Improvement	11	3 or 27·27 per cent.	—	7 or 63·63 per cent.	1 or 9·09 per cent.
Retrogression ...	12	4 or 33·33 per cent.	—	8 or 66·66 per cent.	—

One patient, a woman, died in the sanatorium a week after admission.

The average length of time devoted to treatment was 11·61 weeks, and the average gain of weight, of the 136 who did gain weight, was 10·40 lbs.

The following table is of great interest because it shows the durable nature of the results obtained among the patients treated in 1903 and 1904, *i.e.*, at intervals ranging from 12 to 45 months :—

TABLE K.
SHOWING AFTER RESULTS.

During 1903 and 1904.	On Discharge.	Main- tained Condition.	Relapsed but Living.	Dead.	No History.
Fit for work ...	75	55 or 73·33 per cent.	13 or 17·33 per cent.	4 or 5·33 per cent.	3 or 4·00 per cent.
Fit for light work.	63	28 or 44·44 per cent.	19 or 30·16 per cent.	14 or 22·22 per cent.	2 or 3·17 per cent.
Improvement ...	24	6 or 25·00 per cent.	5 or 20·83 per cent.	13 or 54·16 per cent.	—
No improvement	11	—	—	11 or 100·00 per cent.	—
Retrogression ...	15	2 or 13·33 per cent.	—	13 or 86·66 per cent.	—

From the above table it appears that 73·33 per cent. of those considered fit for full or light work on discharge were similarly fit at intervals of from 12 to 45 months after discharge.

A special feature of the work during 1905 was the employment at the Sanatorium of the patients on a more extensive scale than formerly, and an attempt has been made to adapt the work to the varying capabilities of the patients. The medical officer regards this work as a valuable aid to the treatment, and as affording an index of the patients' physical powers.

Result of Fourth Year's Work.

During 1906 there were 186 patients discharged, but of these three were re-admitted later in the same year, nine were not considered to have consumption, and in 12 the disease was so far advanced that they were discharged as hopeless shortly after admission. These 24 patients are not, therefore, further considered, and the total dealt with is 162.

During 1906 a different method of classification was adopted in place of that formerly employed.

In place of dividing patients into febrile and non-febrile and these again into advanced, slight, long-standing and recent, the area of lung affected has been taken as the basis of classification, *i.e.*:—

- No. 1. Cases with disease extending over less than half of one lobe.
- No. 2. Cases with disease extending over an area equal to half of one lobe.
- No. 3. Cases with disease extending over an area equal to two halves of two lobes, or one whole lobe.

Nos. 1 and 2 are regarded as suitable; No. 3 as less suitable, though still affording a fair chance of recovery; No. 4 and onwards are regarded as unsuitable.

The 162 dealt with in 1906 were grouped on admission as follows:—

No. 1.	50 or 30·87 per cent.	} 43·21 per cent.
No. 2.	20 or 12·34 „	
No. 3.	29 or 17·90 „	} suitable.
No. 4.	63 or 38·89 „	} less suitable.
		} unsuitable.

162

Condition of 162 patients on discharge.

Groups.	Total.	Fit for Work.	Fit for Light Work.	Improved.	Unimproved.	Retrogression.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
No. 1 ...	50	72.00	16.00	4.00	6.00	2.00
No. 2 ...	20	65.00	35.00	—	—	—
No. 3 ..	29	24.14	37.93	17.24	10.35	10.35
No. 4 ...	63	4.77	46.02	25.57	11.11	9.52
Totals	162	36.46	33.95	15.43	8.03	6.17

This same method of classification has been applied retrospectively to the whole of the 326 patients discharged from Kelling Sanatorium during 1903-4-5, with the following result, as regards condition on admission :—

No. 1.	111	} 149 or 45.70 per cent. suitable.	
No. 2.	38		
No. 3.	...	52 or 15.95	,, less suitable.
No. 4.	...	125 or 38.34	,, unsuitable.

Condition of above 326 patients on discharge.

Groups.	Total.	Fit for Work.	Fit for Light Work.	Improved.	Unimproved.	Retrogression.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
No. 1 ...	111	83.78	10.81	1.80	—	3.60
No. 2 ...	38	50.00	36.84	5.26	2.63	5.26
No. 3 ...	52	17.31	51.92	23.08	—	7.69
No. 4 ...	125	5.60	31.20	34.40	16.00	12.80
Totals	326	39.27	28.22	18.09	6.44	7.97

As regards the subsequent history of the above 326 patients at intervals of from 1 to 3½ years after discharge, it was found that of :—

Nos. 1 and 2 (suitable) cases, 60.66 per cent. had maintained their condition.

No. 3 (less suitable) cases, 35.30 per cent. had maintained their condition.

No. 4 (unsuitable) cases, 20.00 per cent. had maintained their condition.

Nos. 1 and 2 (suitable) cases, 15.93 per cent. relapsed, and 3.54 per cent. died.

No. 3 (less suitable) cases, 25.00 per cent. relapsed, and 12.50 per cent. died.

No. 4 (unsuitable) cases, 42.85 per cent. relapsed, and 28.57 per cent. died.

It is hoped too that this employment of the patients will help to remove the imputation which the medical report states is sometimes made that the sanatorium life renders those who participate in it lazy and unfit for work.

I have reproduced the above statistics in full, and practically without comment, because they are, in my view, among the most instructive of the figures which are forthcoming from sanatoria in this country. The particular institution is economically constructed and economically administered, and the class of patient is approximately identical with that with which public sanatoria, whether provided by local authorities or by the State, would be called upon to deal.

Apart, however, from the above and other considerations, there is the fact that in connection with the patients at this institution a serious attempt is made in the direction of promoting what is termed the *after-care* of the patient.

It is recognised by Dr. Burton-Fanning that the future welfare of the patients largely depends upon their being able to secure healthy employment of a light and partial nature. The effect of such employment is regarded as in the first place accustoming the patient in a gradual fashion to adapt himself to work after a considerable spell of rest, and in the second place the healthy employment selected affords to the patient an opportunity of adopting some occupation other than that which he formerly followed, by means of which he may, should circumstances render it desirable, maintain himself in the future. In other words, an attempt is made at Kelling to follow the practice adopted at the State sanatoria in Germany; of endeavouring that is to procure for the patients on their discharge some employment more likely to maintain their resistance against the tubercle bacillus than their previous occupation had proved.

The importance of this work is practically emphasised by the extract furnished from the second annual report which follows Table G, and in which the writer refers to the expression "that the healing effect of sanatorium life, unless supplemented by subsequent care and help, is often thrown away."

This work at Kelling is carried out by what is termed the After-Care Committee; and in order to procure the work desired a printed leaflet, of which a copy is subjoined, is issued in large numbers to employers and to others interested in the work of the institution :—

TO EMPLOYERS OF LABOUR AND OTHERS INTERESTED IN THE WORKING CLASS CONSUMPTIVE.

It is felt that it should be more generally recognised that, in dealing with consumption, sanatorium treatment is only the first step.

Of suitable cases, treated at a sufficiently early stage, a large proportion are discharged fit for work, but if the good gained at the sanatorium is to

be maintained, it is essential that the patient should, on leaving, be able to go to suitable employment in suitable surroundings.

The Committee of the Kelling Open-Air Sanatorium, feeling the vital importance of this side of the work, have appointed a special Sub-Committee, called the After-Care Committee, who consider the future of each of the sanatorium patients, and, where necessary, endeavour to obtain for him when he leaves such employment and surroundings.

Work is provided for a certain number at the sanatorium itself, but as it is impossible to provide in this way for more than a very small fraction of those discharged, the Committee now venture to appeal to employers of labour to assist them.

They can help, it is suggested, in two ways :—

1. By being willing now and then to find temporary light work for a man.
2. By occasionally giving one of our men the chance of a suitable permanent position.

In the first case the idea would be to enable the man for a short time to earn a bare living wage in suitable surroundings while he looked about for permanent work, and, in the second, to provide him, at no doubt a moderate wage, with suitable permanent employment.

Our men are almost all skilled in some trade, and we would obtain in every case a character from the previous employer.

It would be clearly understood that no responsibility whatever, as to the man's health, should be undertaken by the new employer; if a man so employed should break down, the Committee would like to be informed, and would do all they could to secure him further treatment.

The employment may be either out of doors, or, in pure air indoors. It should not involve any great physical effort, nor should it require to be done against time or at high pressure.

The following list contains a few of the employments suggested :—

Light work about a farm or garden.

Driving.

Care-taking.

Agency work, as for instance, Insurance Agency.

Rent Collecting.

Some forms of travelling, &c.

Clerical work if in good conditions.

Estate work, such as light carpentering, looking after an engine, &c., &c.

Motor Car driving.

Check-taking.

Door-keeping, and many others.

The risk of infection has been mentioned as an objection, but there is no doubt that it has been greatly exaggerated, and, in any case, it is certain that a man who has been treated at a sanatorium, whose symptoms have disappeared, and who has been taught the proper precautions, is not only unlikely to be a source of infection, but is actually a missionary of Health to all with whom he comes in contact.

The preferential consideration given to subscribers with respect to the admission of patients into the sanatorium will be given to any employers who will consent to give, instead of a subscription in money, this invaluable practical aid.

May we write to you when we want employment for a man?

Please reply to the Hon. Sec., Kelling Open-Air Sanatorium, Holt, Norfolk.

The Working Patients' Scheme.

This scheme has been evolved in order to aid in the carrying out of the after-care work, and there are now (1906) six such patients.

Employment at the sanatorium under this scheme has come to be regarded as a great privilege by the patients as it involves :—

1. A further prolonged course of treatment free of charge.
2. Opportunity of gradually getting back into full work.
3. Time and opportunity of finding permanent employment while still under medical supervision.

The principles which govern selection and employment of patients under this scheme are :—

1. Only suitable cases and those likely to obtain permanent benefit are admitted to the institution.
2. A graduated scale of work under medical supervision, with the following graduated scale of remuneration :—

5 hours a day work for 2s. a week.

7 " " 3s. 6d. "

Full day's work 5s. "

3. The working patients must do any work they are asked to perform, and remain entirely under the control of the Medical Superintendent.

The actual cost of each working patient to the sanatorium after deducting the value of the work is about 15s. 6d. a week, an expense which is regarded as justifiable in that it materially assists the work and objects of the sanatorium.

With the view of rendering the sanatorium employment as remunerative as possible, a poultry farm has been started, and a considerable business has been carried on in eggs and fattened fowls ; more recently basket making has been introduced.

The Cost of Maintenance.

The estimated cost per head was 30s. weekly, and the experience of 1904 showed that the actual cost was just within this estimate. The average cost for 1905–1906 was, however, £1 11s. 2·9d. and £1 5s. 9·3d. respectively. The latter result was obtained after eliminating the entire cost of the "working patients," but if each patient is left to bear his share of this extra cost, the average cost per week per patient becomes £1 13s. 4·3d. and £1 9s. As has been shown above, there is an extra cost for the "working patients" of about 15s. 6d. a week. With reference to the cost of maintenance during 1905, it has to be borne in mind that for three months, in consequence of structural alterations, there were fewer patients. It is thought that in future the cost per head will be kept down to the estimate given above.

Of the male admissions during 1905 (excluding the patients sent in by the London Charity Organisation Society), 35 per cent. had club money, average about 11s. a week, and their average wage when in health had been 26s.

The following copies of circulars made use of in connection with the sanatorium and its "After-Care" scheme will prove of use.

NOTICE.

The Committee feel that it often happens that patients, for one reason or another, are compelled to return to regular work sooner than is good for them.

The patient, after the usual period of treatment, may feel quite fit for any work, but, we find by experience, it is almost always far better for him if he can continue his life in the open air for a further period, and in gradually relaxing the discipline of strict sanatorium life, and increasing the amount of work he does, slowly accustom himself to the conditions to which he will ultimately have to return.

It is also felt that patients often have great difficulty in getting suitable work after they leave, and so a sub-committee has been formed here to advise and to help them on this point.

A small number of convalescents can be taken at the sanatorium itself. They are no longer treated as patients, but are boarded and lodged at the sanatorium expense, while they are asked to do any work that may be wanted about the place.

They can, of course, only be kept for a limited period.

The advantages to the convalescents are :—

- (1) That they will continue the treatment in a modified form, and have the advantage of the doctor's supervision.
- (2) That they will gradually harden off, and learn how much work they can do.
- (3) That if there is any tendency to break down, they can easily be taken care of, which would be often impossible once they were back at regular work.
- (4) That they will be able to look out at leisure for suitable permanent employment, while at the same time getting their board and lodging found.

A small sum will be allowed weekly to cover washing, &c.

Patients will be asked by the Committee whether they wish to avail themselves of this opportunity, and the Committee are willing to do what they can to help any patient to obtain suitable permanent work.

In order to secure, as far as practicable, what may be regarded as the "after-care" of the patients discharged, a circular, of which a copy is annexed, is sent to the friends of the patient a few weeks after admission.

Copy of Circular.

"It is important to remember that the open air treatment of the patient should not cease on leaving the sanatorium. Whether the disease is arrested, or the condition merely improved, it is essential that he should always continue the principles of the treatment. All the living rooms should be abundantly supplied with fresh air, and windows should be kept open day and night. If the patient is to maintain his health he must be well fed and lead a healthy life. This may entail the necessity of changing his former occupation.

"As all this may be difficult to arrange, it is very necessary for the friends and for those interested to begin to consider the question at once, and to begin to find suitable employment as soon as possible after the patient's admission.

"Any employment which does not demand arduous labour or strain, and which allows of a good deal of fresh air, is suitable; exposure to bad weather is not necessarily harmful, but work in unventilated rooms or shops is most

prejudicial. Light farm work or light gardening work, such clerical work as can be performed in good air, agency work, driving, caretaking—in fact any light work in good air or out of doors is suitable, but before deciding it will be well to ask advice at the sanatorium, as the exact condition of the patient must be allowed to determine the precise nature of the work for which he is best fitted. This advice will most willingly be given, but the onus of finding suitable employment must rest with the patient's friends."

The following circulars furnish information with respect to the conditions of admission and show the efforts which are made to restrict admissions to very early cases :—

INFORMATION FOR APPLICANTS.

This sanatorium is available only for those who cannot afford to pay the fees asked in private sanatoria.

NONE BUT EARLY CASES TAKEN.

Applicants should write to the Hon. Secretary of the Admission Sub-Committee, Kelling Sanatorium, Holt, Norfolk, for the necessary forms, which, when filled up, should be returned to him.

If the applicant is considered to be socially, financially, and medically suitable, and if the necessary payments can be arranged for, the case will be accepted. The patient will be informed in due course when he or she can be taken.

Owing to the free gift of the land and buildings, and to the Endowment and Subscription Funds, the Committee is able to take patients at a charge of 30s. per week per bed, and in each case before admission this money will have to be arranged for. There are certain beds for which this 30s. is wholly arranged by Annual Endowments, and the nomination to these beds rests with the Donors, subject to the control of the Committee. In the case of the other beds, the nomination lies with the Admission Sub-Committee, who, after full enquiry, arrange for the payment of the 30s. either by the patient, or by his friends, or assisted as far as the funds allow, and according to the needs of the patient, by a grant from the Special Funds for that purpose.

In any case, it is a rule of the sanatorium that every patient should pay what he or she can afford.

Patients are expected to do, as part of their treatment, such light work about the place as the doctor may direct.

There are no "extras." No charge is made for drugs, nor for the patient's personal washing (if not more than 7d. per week).

If a patient breaks his thermometer, 1s. will be charged to replace it.

Patients should bring warm clothes (night wear should be woollen or flannelette), a rug, a warm great coat or cloak, thick boots, and, if possible, a dressing gown. All clothes should be clearly marked.

All payments should be made in advance, either weekly or monthly (the latter being most convenient), to the Hon. Sec., Dr. H. W. McConnel, Matlaske Hall, Norwich.

The railway station is Holt, on the Midland and Gt. Northern Joint Railway.

From London, depart from King's Cross (Gt. N.).

From Norwich, depart from City Station.

A cab should be ordered to meet the train by writing to "The Feathers" Hotel, Holt, Norfolk. The fare (by special arrangement) is 1s. 6d.

THE IMPORTANCE OF EARLY TREATMENT FOR CONSUMPTIVES.

To prevent disappointment the Committee cannot draw attention too strongly to the fact that *they are only prepared to take early cases.*

Though the treatment may effect improvement in even advanced cases, its best results are only obtainable in the early stages, when the disease has not already undermined the constitution.

Therefore, while the number of applications so far exceeds the accommodation, the Committee are obviously making the best use of the beds if they restrict the admissions to patients who can not only be improved, but also restored to lasting fitness for work.

Further, the Committee would take this opportunity of impressing upon the public the importance of securing advice and sanatorium treatment for consumptives *directly the malady declares itself. It cannot be too strongly insisted upon that this is the time to secure sanatorium treatment.* The patient may have had a slight hæmorrhage, but otherwise feel perfectly well, or perhaps the doctor has discovered symptoms of the disease quite unsuspected by the patient. A year, a few months, a few weeks later perhaps, and the disease has progressed, and the lost ground can never be regained. It is often difficult (and naturally so) to persuade a man to leave his work, or a woman her child, under such circumstances, but it is a fact that most of the advanced and permanently crippled cases that come to sanatoria to be patched up could have kept their health and strength had they come at the right time.

NEWCASTLE-UPON-TYNE AND NORTHUMBERLAND SANATORIUM (BARRASFORD).

(Opened May, 1907.)

For some time past the Newcastle-upon-Tyne and Northumberland Branch of the National Association for the Prevention of Consumption, of which the Right Honourable Lord Armstrong, D.C.L., is the President, and of which Dr. O. W. Ogden, of Newcastle, is Honorary Secretary, have endeavoured to procure a sanatorium for this county of Northumberland.

The Committee entrusted with the carrying out of this work and with the collection of the necessary funds decided, after visiting numerous sites in different places, to purchase some sixty acres, mainly moorland, near Barrasford-on-Tyne.

This site occupies a commanding position and affords an extensive panorama of the hills and country to the south and west. It is situated at an elevation of some 650 feet above Ordnance Datum about three miles from Barrasford Railway Station, in country very sparsely inhabited. The site comprises some ten acres of woodland, which being situated to the north-east of the sanatorium affords shelter from the winds coming from that quarter. The slope of the ground is towards the south, and as the sanatorium is erected on this slope at an elevation of about 80 feet below the highest portion of the grounds, some shelter is afforded by this means from the winds blowing from the north. Trees have now been planted immediately to the north and west of the sanatorium and of the several other buildings. At my visit, which was in September, 1905, I was accompanied by Dr. Ogden, the honorary

secretary, and by Mr. J. Landell Nicholson, a member of Messrs. Nicholson and Dotchin, the firm of architects whose designs for a sanatorium were accepted by the Committee, and who were in charge of the works. I am much indebted to both these gentlemen for the assistance which they were then and have been since good enough to afford me.

The sanatorium buildings which have been erected upon the site are of what is known as the "temporary" variety, *i.e.*, they are composed of wood and corrugated iron, the foundations, chimney stacks and boiler house alone being of stone. The superstructure, which was furnished by Messrs. Speirs and Co., of Glasgow, was brought in sections from that city. The walls of the building consist from without inwards of corrugated iron, wood, an air space and a layer of felt, after which there is a second air space and an inner lining of felt and wood. Over this latter is a covering of "Uralite," a substance which, while affording a smooth fireproof surface, offers facilities for cleansing and disinfection.

A reference to the plans accompanying this account will serve to show the general arrangement of the buildings on the site. It has to be noted, however, that provision has only in the first instance been made for 50 patients, namely, beds for 30 males in the western wing and for 20 females in the eastern wing. But meanwhile the accommodation in the administrative portion of the buildings is sufficient to provide for 100 beds, it being the intention of the Committee when the funds allow of it to carry out the extensions shown on the main plan.

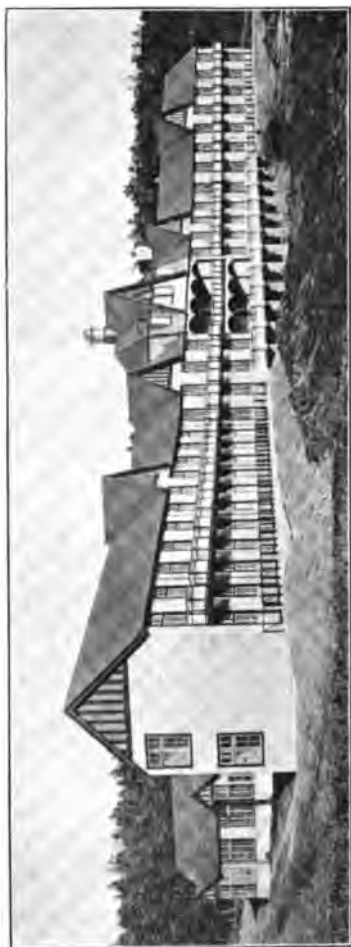
The existing buildings consist of—

- (a) The sanatorium proper, which comprises also the administrative building.
- (b) An isolation block for cases of the acute infectious diseases should they arise.
- (c) The laundry, engines and disinfecting block.
- (d) The stables.
- (e) The caretaker's house.

The precise position of each of these buildings is shown in the accompanying block plan.

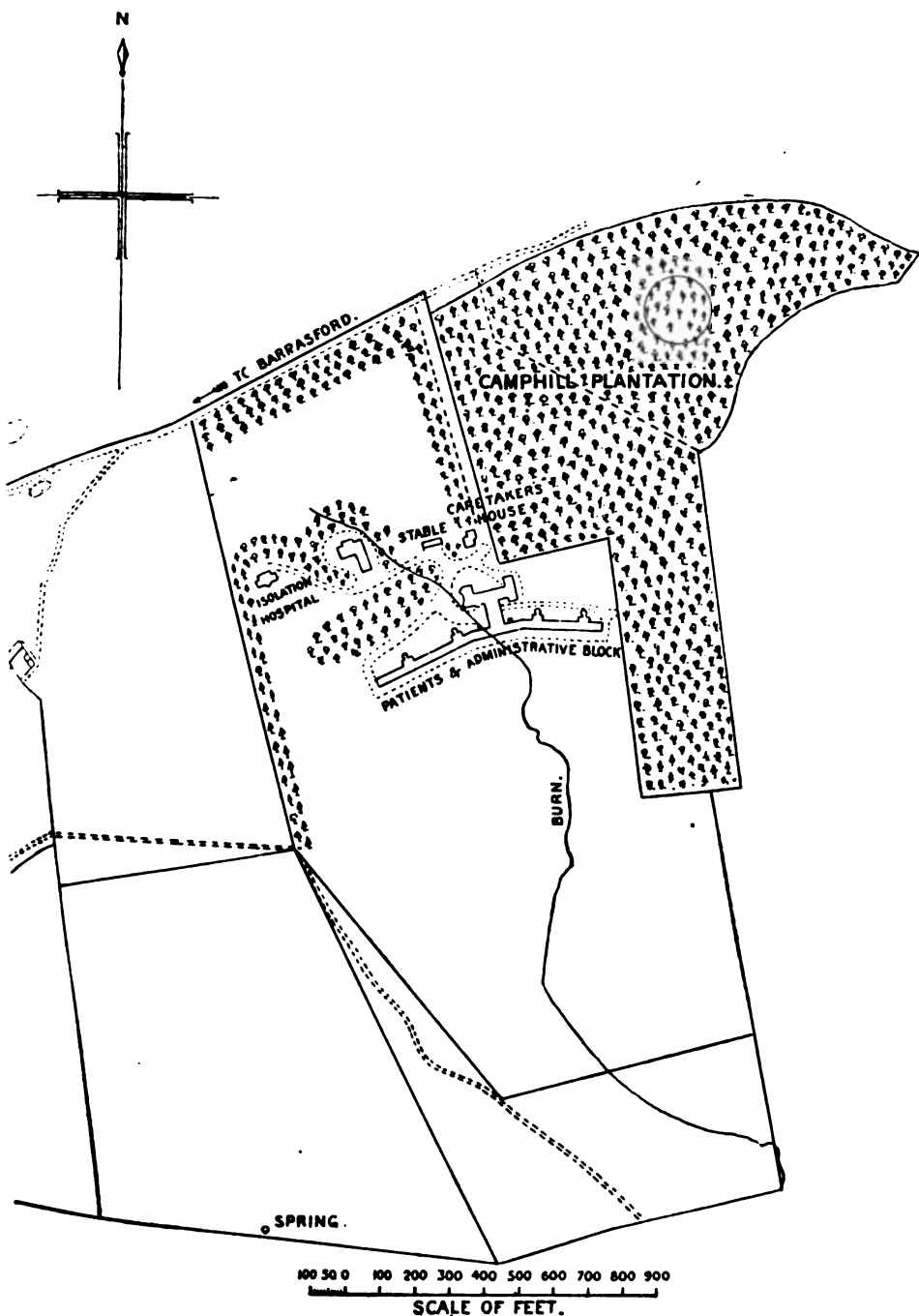
The sanatorium proper consists of a central three storied structure from which a two storied wing stretches out on either side, the western wing being for males and the eastern for females. Projecting northwards from the central structures are the buildings which comprise the administrative offices generally, the dining-hall and the recreation hall.

These halls are approached from the sanatorium proper by a corridor on either side of which are the entrances from the grounds as also certain offices and rooms for the staff. The nurses' bed rooms are on the upper floor of the centre of the sanatorium and the servants' bed rooms on the first floor of the eastern wing of the administrative building.



GENERAL VIEW OF THE SANATORIUM.

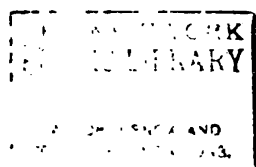
(To face page 448.)

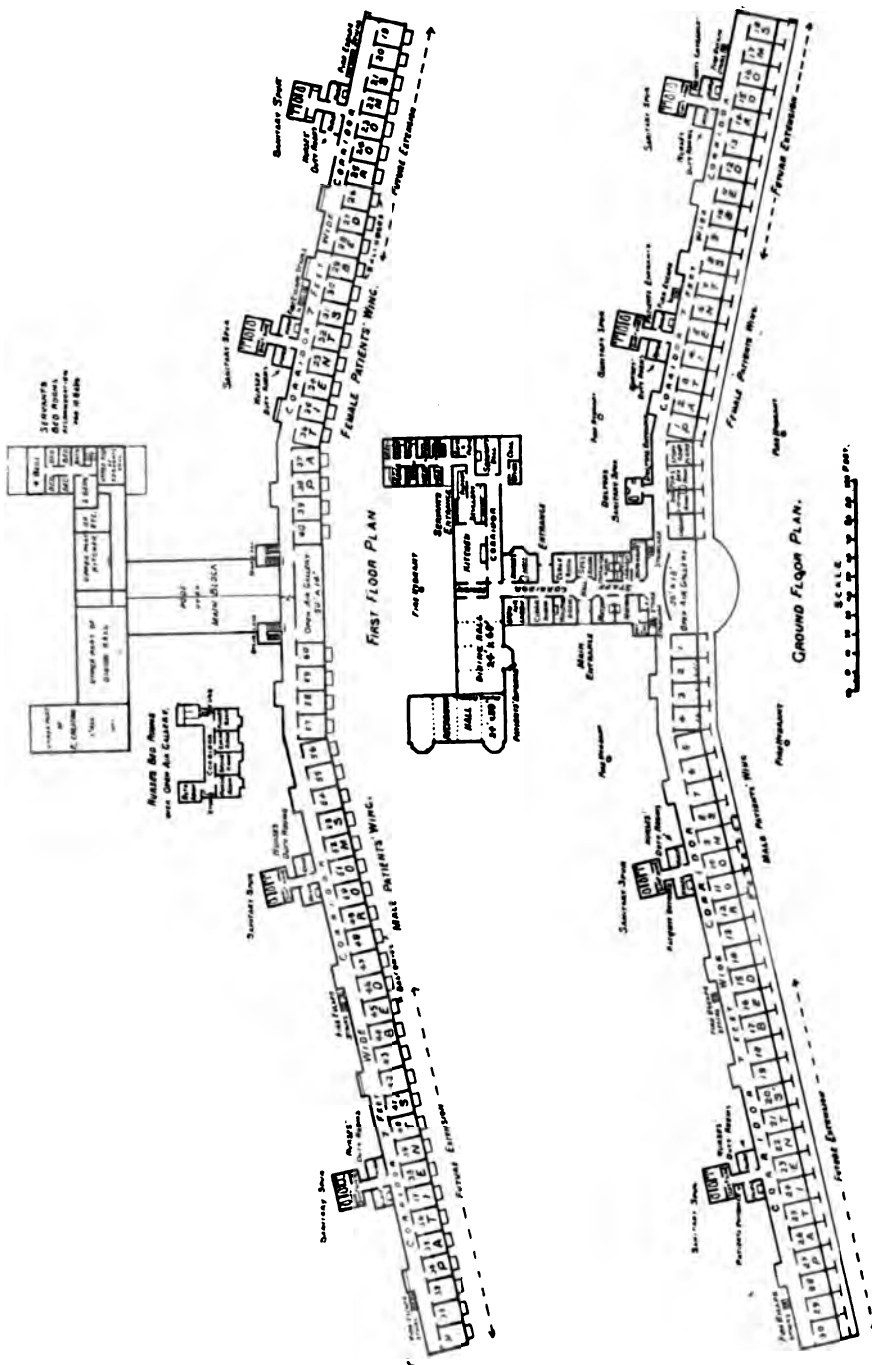


NEWCASTLE-UPON-TYNE AND NORTHUMBERLAND SANATORIUM (BARRASFORD).

(Plan showing position of buildings on site.)

(First plate to follow plate facing page 448.)





NEWCASTLE-UPON-TYNE AND NORTHUMBERLAND SANATORIUM (BARRASFORD).

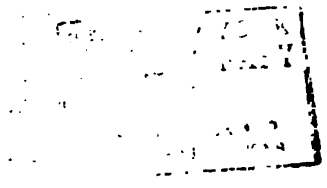
(Second plate to follow plate facing page 448.)

THE UNIVERSITY OF CHICAGO

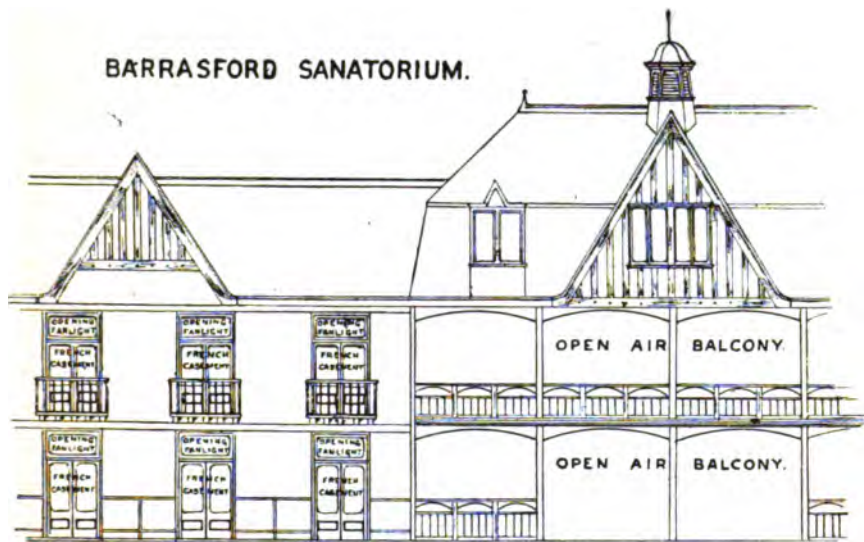
LIBRARY

1952

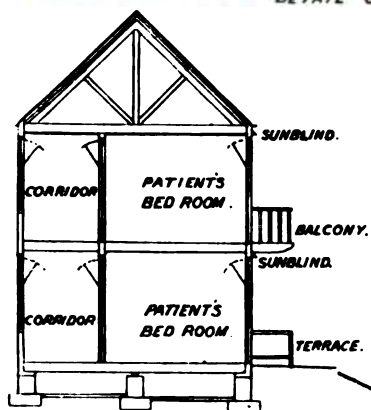
THE UNIVERSITY OF CHICAGO



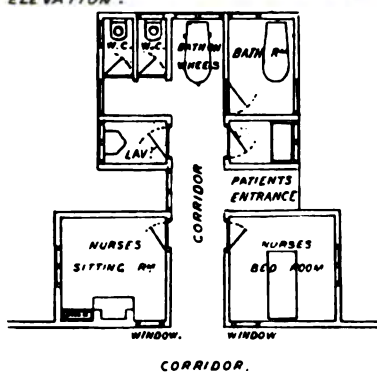
BARRASFORD SANATORIUM.



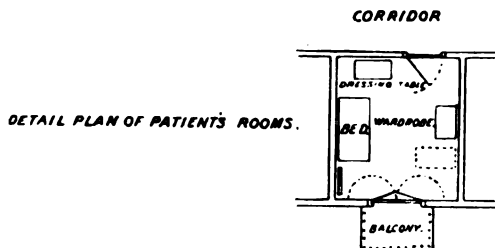
DETAIL OF FRONT ELEVATION.



DETAIL SECTION OF PATIENT'S ROOMS.



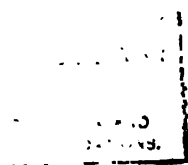
DETAIL PLAN OF SANITARY SPUR.



DETAIL PLAN OF PATIENT'S ROOMS.



(Third plate to follow plate facing page 448.)



Each patient is provided with a separate ward, the arrangement of the wards being the usual one with a corridor in the rear giving access to the wards on their north side and affording light and through ventilation to them on that side. This corridor also gives access to the sanitary spurs, which comprise bath rooms, closets, and lavatories, the entrance to each of such spurs being guarded by the nurses' bed and sitting rooms. From this corridor, the bay windows of which are so constructed as to afford resting places for the patients when necessary, there is a fire escape staircase leading to the grounds.

In front of each of the wards there is on the ground floor an enclosed verandah so constructed as to afford to each patient a certain amount of privacy immediately outside his own ward, while on the first floor there is a similar provision by means of self-contained balconies of sufficient size to accommodate the patient when reclining on a long chair. These separate verandahs and balconies are rather a novel feature of the institution. In front of the sanatorium there is a well-arranged terrace upon which the patients can take exercise and from which they can enjoy the view to be obtained therefrom, and in the centre of the building there is on each floor a large open air gallery which enables the patient to enjoy the fresh air while resting and in company of other patients.

The cubic space afforded to each patient is fully 1,600 cubic feet. All ventilation is carried out by French casement windows with opening fanlights reaching to the ceiling above them, there being also similar fanlights over the door and in the corridor opposite to the door. There is thus afforded opportunity for a thorough and continued exchange of air.

Water is procured from a boring sunk into the whinstone to a depth of 100 feet and yielding a daily supply of nearly 6,000 gallons. The water, which has furnished satisfactory results on analysis, rises naturally to the ground level and it is stored above the boring by means of a well some 20 feet in depth. From this it is pumped to the service reservoir which is situated to the north of the sanatorium, and from this reservoir the water flows by gravitation to the institution. In the event of fire provision is made whereby the water may be pumped direct to the institution, this arrangement allowing for a considerable increase of pressure.

Lighting is by means of electricity generated on the estate, and warming by low pressure steam pipes, with radiators in each of the patients' rooms.

The sewage is disposed of on the site by means of a septic tank and bacteria beds, the effluent being eventually allowed to find its way to the small stream which traverses the site.

The cost per bed when the total number of 100 beds is completed is estimated at £250, but the cost of the existing beds, inclusive of the site, has been considerably in excess of this.

As regards the cost of this institution, Dr. Ogden tells me that only to June, 1906, the total expenditure had been about £20,000, including the cost of the site, and it was estimated that the furnishing would involve a further expenditure of £2,000. It was further estimated that the accommodation for the second fifty patients could be added for £5,000, and finds that the completed institution for 100 beds would cost about £27,000, *i.e.*, £270 per bed.

THE NOTTINGHAM SANATORIUM (SHERWOOD FOREST).

(Opened 1901.)

This institution was founded largely through the efforts of Dr. W. B. Ransom, of Nottingham, and it affords a good illustration of the cost of what are known as "temporary," *i.e.*, wooden buildings; as such it is of considerable interest in relation to the sanatorium problem as a whole.

The institution is erected at Ratcher Hill, in Sherwood Forest, near Mansfield, upon an elevated site consisting of 50 acres of land presented by the Duke of Portland. The soil is gravel; and the sanatorium stands in grounds which are covered with pine trees and heather, and from which an extensive view of the surrounding country is obtainable.

The cost of erection, furnishing, lighting, sewerage, water supply, &c., slightly exceeded £5,000, a sum which was provided solely by voluntary subscriptions.

Among the public bodies subscribing were the Corporation of Nottingham (£1,000), and the Town Council of Mansfield (£200).

The building itself is a wooden structure erected upon a brick base, and having a galvanized iron roof. The central portion of the structure, which has two storeys, is devoted to administrative purposes, and is of such dimensions as to afford service for a larger number of patients than that for which the institution was in the first instance intended. Running out from each side of this administrative centre is a wing for the accommodation of patients—one wing for males and the other for females. There is a small single ward in connection with each wing, and on either side of the main wards is a glass-roofed verandah, closed at either end and open in front, which acts as a *Liegehalle*, and in which certain of the patients sleep during the night.

In the grounds close to the sanatorium are shelters for male and female patients.



THE NOTTS. CONSUMPTION SANATORIUM, SHERWOOD FOREST, MANSFIELD.

(To face page 450.)

The details of the building are those usually found in the better class "temporary" buildings, i.e., the walls are composed of two layers of felt-lined boarding separated by an air space, the inner surface of the walls being so constructed as to afford facilities for cleansing and disinfection.

Ventilation is provided for by windows, and in the roof of each large ward are two extraction shafts.

Lighting is by means of electricity, generated upon the site; and warming by means of low-pressure pipes arranged in the form of radiators.

The lavatories are disconnected from the wards, and the sewage is conveyed to a distance and treated biologically. The water supply is from the Mansfield public service.

There are, in addition to the sanatorium building proper, several out-houses devoted to such purposes as electric light, laundry work, stabling, &c.

The annual cost of maintenance is about £75 per bed, which figure includes food, cost of medical attendance, nursing, and all current expenses.

Conditions of Admission.

Persons applying for admission must,

- (1.) satisfy the Committee that they are unable to pay for treatment at a private institution or to obtain proper treatment at home, and
- (2.) be certified by one of the consulting physicians to be in such a stage of the disease as to afford reasonable expectation of permanent improvement or cure.

Paying Patients.

Patients who pay the whole cost of their maintenance (31s. per week) are admitted to the sanatorium if the free and partly-free beds are not all occupied, but such patients must be eligible in the sense set out above.

Subscribers of one guinea per annum are entitled to one recommendation, valid during the year of issue and the subsequent year; but persons or groups of persons who pay the cost of maintenance for a bed for at least three months shall have the sole right of nominating patients for that bed, i.e., a subscription of £20 gives the right of nomination to a free bed for three months; or a subscription of £12 10s. to a bed for which a patient pays 10s. a week, for the same period.

Here then is a temporary structure which provides administrative accommodation for more than the 24 patients for which the sanatorium was erected. The total cost was over £5,000 exclusive of the site—i.e., the cost per bed amounted

to £220. Clearly had the site been bought, the cost per bed would have been considerably greater. But, taking all things into consideration, this cost of £220 per bed is hardly a fair way of stating the problem, since much of the outlay expended on the administrative buildings, electric light, sewerage, water supply, roads, &c., will furnish accommodation for a larger number of patients, and an addition to the number of shelters would provide a greater number of beds at a comparatively small cost; indeed, since the institution was started, two shelters, for one bed each, have been provided, as also, more recently, an extension of the male wing, by which four more beds have been added to the accommodation, *i.e.*, the institution now contains 30 beds—17 for males and 13 for females.

Support by Local Authorities.

The following Local Authorities contributed to this institution in 1906 :—

	Subscription for the year.		
	£	s.	d.
Nottingham Corporation	75	0	0
Newark Corporation	75	0	0
Mansfield Corporation	32	0	0
Basford Guardians	20	0	0

Results.

Condition of patients on discharge from the sanatorium in each of the five years 1902 to 1906.

Note.—Stage 1 = Early Phthisis.
 " 2 = Serious Phthisis.
 " 3 = Advanced Phthisis.

The term "Arrested" is used when there is no expectoration, no fever, and no sign of active disease in the chest.

Year and number of cases.	A Arrested	B Much improved.	C Improved.	D Stationary.	E Worse.	F Died.
1902. 41 cases discharged.	5 cases :	12 cases :	18 cases :	2 cases :	4 cases :	None
Average gain in weight 8½ lbs.	3 in stage 1 2 in stage 2	4 in stage 1 7 in stage 2 1 in stage 3	3 in stage 1 9 in stage 2 6 in stage 3	1 in stage 1 1 in stage 2	2 in stage 2 2 in stage 3	
Maximum gain 18 lbs.						
One woman and two men lost weight.	Average duration of stay :	Average duration of stay :	Average duration of stay :	Average duration of stay :		
	4 months.	4½ months.	4 months.	4½ months		

Results—continued.

Year and number of cases.	A Arrested.	B Much improved.	C Improved.	D Stationary.	E Worse.	F Died.
1903. 69 cases discharged. Average gain in weight 16½ lbs. Maximum gain 3 st. 13 lbs. One man lost weight.	17 cases: 14 in stage 1 3 in stage 2 Average duration of stay: 4½ months.	19 cases: 7 in stage 1 11 in stage 2 1 in stage 3 Average duration of stay: 4 months.	19 cases: 3 in stage 1 10 in stage 2 6 in stage 3 Average duration of stay: 5½ months.	4 cases: 2 in stage 2 2 in stage 3 Average duration of stay: 5½ months.	10 cases: 2 in stage 1 7 in stage 2 1 in stage 3 Average duration of stay: 5¼ months.	None
1904. 80 cases discharged. Average gain in weight 1 st. 4 lbs. Maximum gain 3 st. 4½ lbs. Average stay 3½ months.	21 cases: 19 in stage 1 2 in stage 2 Average stay: 3½ months. Average gain in weight: 1 st. 4 lbs.	27 cases: 14 in stage 1 13 in stage 2 Average stay: 3½ months. Average gain in weight: 1 st. 6 lbs.	19 cases: 1 in stage 1 13 in stage 2 4 in stage 3 1 case of hip disease. Average stay: 3½ months. Average gain in weight: 1 st. 3 lbs.	9 cases: 1 in stage 1 5 in stage 2 3 in stage 3 Average stay: 3½ months. Average gain in weight: 1 st. 1 lb.	4 cases: 1 in stage 1 3 in stage 2 Average stay: 3½ months. Average gain in weight: 12½ lbs.	None.
1905. 86 cases discharged. Average gain in weight 13½ lbs. Maximum gain 45 lbs. Average stay 14½ weeks.	23 cases: 20 in stage 1 3 in stage 2 Average stay: 13¼ weeks. Average gain in weight: 16¼ lbs.	36 cases: 10 in stage 1 24 in stage 2 2 in stage 3 Average stay: 15½ weeks. Average gain in weight: 15½ lbs.	24 cases: 6 in stage 1 14 in stage 2 4 in stage 3 Average stay: 14½ weeks. Average gain in weight: 12½ lbs.	7 cases: 3 in stage 1 3 in stage 2 1 in stage 3 Average stay: 17½ weeks. Average gain in weight: 11½ lbs.	5 cases: 0 in stage 1 2 in stage 2 3 in stage 3 Average stay: 8½ weeks. Average gain in weight: 4¼ lbs.	None.

Results—continued.

Year and number of cases.	A Arrested.	B Much improved.	C Improved.	D Stationary.	E Worse.	F Died.
1906. — 102 cases discharged. Average gain in weight 18·11 lbs. Average stay 12·64 weeks.	27 cases : All in stage 1. • Average stay : 12·07 weeks. Average gain in weight : 13·11 lbs.	34 cases : 13 in stage 1 21 in stage 2 • Average stay : 15·5 weeks. Average gain in weight : 13·7 lbs.	29 cases : 3 in stage 1 24 in stage 2 2 in stage 3 • Average stay : 15·06 weeks. Average gain in weight : 10·06 lbs.	7 cases : 1 in stage 1 6 in stage 2 • Average stay : 12·14 weeks. Average gain in weight : 8·72 lbs.	5 cases : 4 in stage 2 1 in stage 3 • Average stay : 9·6 weeks. Average gain in weight : 2·3 lbs. 3 patients lost weight.	None

Lasting Effects of the Treatment.

In January, 1907, the following was the condition of all those who had left the sanatorium up to December 1st, 1906 :—

Report of 359 Patients who left the Sanatorium between February, 1902, and December 31st, 1906.

A Well and at Work.	B Well but not Working.	C Not Well but Working.	D Not Well and not Working.	E WORSE.	F DEAD.	G Not heard from.
174	21	7	22	8	98	29

As to this table the Resident Medical Officer states in the fifth annual report :—

“Some of those in Class B are not obliged to work and are known to be as well as some of those in Class A who report themselves as ‘well and at work.’ Obviously financial conditions and individual temperament influence this classification.”

It may be mentioned that about 300 of the total number of patients admitted have come from the county of Nottingham.

Abstracts from Annual Reports.

In their fourth annual report the Committee again urge, as they did in their third report, the “imperative necessity of *early* treatment”; and they state that their former appeal in this

direction seems to have fallen upon deaf ears. About 75 per cent. of the applicants for admission only came before the consulting physicians when their malady had already reached a hopeless stage. Among 69 who were actually admitted only 25 were in the early stage of the disease.

The Committee urge upon the public and the medical profession the *vital importance of prompt, prolonged, and early treatment.*

The report continues :—

"If this were done we should hear less of relapses of sanatorium patients after their return home, though unfortunately with poor patients such are bound to occur more often than with the rich if they return to their former conditions of work and dwelling. In previous reports it has been pointed out that three or four months at a sanatorium cannot be said to complete a cure or do more than check the disease. It is necessary that favourable conditions of life should be observed for a year or two at least, and it was for this object that our 'After-Care' Committee was formed."

In the fifth annual report the Committee state :—

"The extreme importance of *early* treatment is again made obvious from the fact that of the 21 "arrested" cases, 19 were in the first stage and two in the second. That sanatorium treatment will not arrest every case of even early phthisis is also shown by the fact that of the 13 cases which remained stationary or got worse, two were in the first stage. These facts are well known to the medical profession, but it is necessary to make them clear to the public in order to secure the greatest benefit from sanatoria, and to prevent exaggerated notions of their capabilities."

The sixth annual report states :—

"The necessity of the early recognition and treatment of phthisis must be *again insisted on*, and a further lesson of our experience pointed out that those cases do best which before admission into the sanatorium have been for a time under observation in the general hospital.

"As was said in the last report there is a small proportion of acute cases which will not respond to any treatment, however early, and it is only by careful preliminary observation for a few weeks that these cases can be eliminated. It is impossible for a doctor at a single interview to certify that a given patient will give a satisfactory response to sanatorium treatment; such preliminary observation can best be carried out in the wards of a hospital, where proper treatment can also be commenced, and the loss of valuable time avoided. Moreover, this preliminary hospital treatment has the further advantage that some cases which at first sight seem unsuitable for the sanatorium, show unexpected recuperative power, and are afterwards transferred there with benefit. It may be laid down as a general rule that a sanatorium for the poor is best worked in connection with an urban hospital."

As regards the important question of after-care the Committee make the following significant statement :—

"It is known that some of our former patients, though presenting no signs of disease, are unable to find suitable work. In the struggle against tuberculosis in the poor this after-care is a matter of vital importance.

"It has always been pointed out that a stay of three or even six months in the sanatorium cannot do more than arrest or check the disease, which may break out again on return to the previous unhealthy conditions of life. A most careful life for a period of two years at least is needed before a "cure" can be fairly spoken of. To the rich consumptive this is possible. We wish to make it so to the poor."

An After-Care Committee has been formed and during 1906 it was able to carry out some useful work. Its main object has been to find employment for discharged patients in order that they may procure the ordinary needs of existence. The 1906 annual report observes that :—

“It cannot be repeated too often that the good results of Sanatorium treatment are entirely thrown away if the discharged patient is unable, through lack of employment, to have decent lodging and sufficient food, for overcrowding and improper nourishment are in themselves among the fruitful causes of this disease.”

I am indebted to Dr. Ransom for permission to reproduce the accompanying illustration of the sanatorium, and for assistance in other directions.

MAITLAND COTTAGE SANATORIUM.

(Founded October, 1902.)

This sanatorium, which is an annexe of the Kingswood Sanatorium, occupies an elevated situation 375 feet above Ordnance Datum, on the chalk of the Chiltern Hills and but a short distance from Kingswood and Peppard Commons, both of which are available for exercise by the patients. The site, which consists of $8\frac{1}{2}$ acres of grassland and garden, is distant some six miles north of Reading, from which place it is most conveniently reached.

The institution is philanthropic not only in its conception but also in its administration, and all profits over and above those necessary to cover the actual cost of working are devoted to the assistance of the poorer patients or to the extension of the institution.

The applications for admission were from the first so numerous that the number of beds (originally six only) had to be increased on several occasions. In 1904, although the number of beds had in the meantime reached 14 (six for males and eight for females), it was only found possible to admit one out of every three applicants. Additional sleeping shelters were therefore added ; and in 1905, through the generosity of Dr. Sidney Davies, the medical officer of health of Woolwich, and of Miss Schuster, an additional ward for four beds (of which a separate illustration is here furnished) was added to the men's side. Twenty-four patients are now accommodated, though the buildings are only calculated to admit 18.

The existing buildings, which have a south-west aspect, consist, with the exception of the dining room and kitchen, which are of brick, of the usual “temporary” buildings with red tiled roofs. In connection with each is a verandah upon which the beds



GENERAL VIEW OF MAITLAND COTTAGE SANATORIUM.



FOUR-BEDDED BUNGALOW RECENTLY ERECTED.

can be wheeled. There is abundant provision in the buildings themselves for a plentiful supply of fresh air.

Lighting is by means of acetylene gas, which Dr. Esther Carling, the Medical Director, informs me has proved thoroughly satisfactory; while warming, except in the dining-room and kitchen—by means of open fire-places—is by stoves. In certain of the wards no warming apparatus whatever has been found necessary.

Water is supplied from a deep well in the Chalk, and the sewage is disposed of by sub-irrigation.

There is a separate dining-room for the patients of each sex, and the chalets, &c., of the females are in a separate portion of the grounds from those of the males.

Admission is for the most part by means of an application form, accompanied by a medical certificate setting forth the extent of the lung involvement and the general condition of the patient's health.

In the case, however, of the Woolwich Corporation, which subsidises six beds at an annual cost of £75 per bed, the patients are carefully selected by the medical officer of health. Patients from Woolwich are now being sent in an increasing degree to the sanatorium for a stay of one month for educational purposes, and from the patients thus sent Dr. Carling selects for fuller treatment those who have shown indications of a favourable reaction. In the case, also, of the Reading Corporation, who annually subsidise two beds, the medical officer of health selects patients from among those sent to him by medical practitioners.

The inclusive fees are 30s. weekly, but there are six beds reserved for persons who are unable to pay the full fee for a sufficient length of time. For these beds 25s. weekly is charged, there being a small charitable fund out of which the difference is made up.

The cost of this establishment, which consists mainly of temporary buildings, is a matter of interest, and Dr. Carling has been good enough to furnish me with the following figures:—

	£	s.	d.
Buildings	2,002	9	4
Furnishing	261	0	2
Water supply (part of) ...	350	0	0
Land (8½ acres)	1,000	0	0
Acetylene gas installation ...	60	3	4
Garden expenses	15	17	2
	<hr/>		
	£3,689	10	0

	£	s.	d.
Initial cost per bed of 18 beds (including land)	204	19	5
„ „ „ (excluding „)	149	8	4

Cost of Maintenance and Result of Working during 1905.

The Medical Director has furnished me with the following particulars for 1905 :—

Total number of patients	...	...	85
Average duration of residences	...	...	11½ weeks.
Average number of patients	...	...	19
			£ s. d.
Average weekly payment	...	...	1 4 2*
Average cost per person	...	...	1 3 2
Cost of food only per patient per week	0	10	5
Cost of food per head including staff	0	8	3

The total resident staff comprises 1 matron, 1 nurse, 3 servants, also 3 ex-patients, who are given their "keep" and various grades of pocket money in order to fit them for ordinary work outside (as also a non-resident gardener).

The institution shares with the Kingswood Sanatorium the services of the two resident physicians.

After Results.

Between June, 1899, and June, 1905 (six years), there have been treated in the institution, while situated either at Kidmore or Kingswood, 219 cases, and of this total the condition on admission was as follows :—

Early	98	} 219
Moderate	...	...	...	64
Advanced	...	...	...	57

And in June, 1905, the condition of the members of the several groups was as follows :—

—	Total.	Working.	Chronic.	Dead.	Unknown.
		Per cent.	Per cent.	Per cent.	Per cent.
Early	98	90·8	5·1	3	1·1
Moderate	64	53	25	17	5
Advanced	57	12	22	66	—

Excluding from the 219 cases 20 who were hopeless at first and 29 others who did not improve, the figures relative to the remainder work out as follows :—

65 per cent. of all patients were at work on June, 1905.
 17 „ were dead.
 18 „ were chronic.

* This sum refers to the average of 19 patients, but as one patient was kept as a worker throughout the year and paid nothing, the average for 18 patients would be £1 5s. 6d.

Dr. Carling is desirous still further to develop the work on permanent lines, and she has drafted the following provisional scheme :—

1. An increase in the number of beds for both males and females, such accommodation to be provided by means of separate houses for each sex.
2. Provision for children of some 20 beds, together with the establishment of an open air school.
3. Provision for cases of pulmonary tuberculosis which are too acutely ill to be treated in the general wards without mutual disadvantage and distress.
4. Arrangements for the employment of patients who have been sufficiently restored to undertake light work under good conditions, but who are not "hard" enough for ordinary work apart from the regular control and influence of sanatorium life.
5. Such administrative quarters as will allow a certain number of voluntary workers to reside in the colony, such workers paying for their own maintenance and giving their time to the organisation of employments for the patients, after the manner common in such places as university settlements.

She adds with reference to sanatorium treatment generally :—

Some discredit has been thrown upon the sanatorium treatment of the working classes on the ground that the good gained is only temporary, and that on a return to their ordinary life patients soon relapse. This discouragement arises from two causes : (1) Unsuitable cases have been selected ; (2) Three months has been expected to do the work of two or three years. Let it be fully realised that consumption once established is not to be cured by a three months' course in a sanatorium. It may become sufficiently arrested to allow the patient to return to some measure of work, and if at this point it were possible to employ him in some open air colony under the eyes of the physicians who had watched both his individual progress and had experience of many other cases, it is certain that many lives would be saved, and success recorded to the system, which are now sacrificed because of the too sudden plunge to a long day's work after the enforced idleness and high feeding of the sanatorium.

Trials of this sort that have been made in this direction have amply proved how well worth while it is to have patience and confidence. To provide work and maintenance for, say, two years is, of course, a very serious undertaking, but if experience is gained by small experiments it is believed some practicable working scheme could be evolved which might be made use of by friendly societies and public authorities whose funds would allow them to provide accommodation on a wholesale scale.

The establishment of a colony of various departments provides in itself for a large amount of work for ex-patients. The production of poultry, eggs, vegetables, fruit, and milk ; the care of pigs, cows, and horses ; the necessary stable arrangements for the carrying to and fro of patients, staff, and visitors ; the domestic work in almost all branches, the gardening, the laundry, the clothing of the community, part of the nursing and teaching. All of these things are works immediately at hand, and, beyond these, there are possibilities of fruit and flower farming, bee-keeping, basket-making, &c., for an outside market.

But in connection with these industries it should be clearly understood that experience gives no encouragement that the colony could ever support itself by its labours. The weak cannot compete with the strong in the struggle for existence, but they can help towards their maintenance and keep up and increase their self-respect and "morale" by a life of regulated and necessarily restricted industry.

The above passage is quoted because it represents the ripened judgment of six years' work among the consumptive poor.

In a special appeal for £10,000 recently issued, the following extensions are contemplated (1) Increased accommodation for adult patients. (2) The formation of a "working colony" for convalescents. (3) The addition of a children's department—"A sanatorium school."

It is thought that in the colony 15s. would suffice to support the "working" patient, since the non-workers cost 30s. per week. It is contemplated that the enlarged sanatorium would make provision for some fifty adult patients and "workers" and fourteen children, and that the accommodation could be secured at a cost of under £150 per bed, including the purchase of a freehold farm of 40 acres. The opinion is expressed that "elaborate buildings are not desirable, as patients treated in such cannot afterwards adapt the conditions of this open-air cure, as learnt in the sanatorium, to life in their own homes."

Other evidence relative to Maitland Sanatorium.

In his annual report for 1905, Dr. Sidney Davies, medical officer of health for the Metropolitan Borough of Woolwich, stated that in August, 1903, the Council began to maintain two beds at this sanatorium, but that in May, 1904, this number was increased to three. In the first instance patients were kept in this sanatorium for three months, but it was later determined to use these three beds for treatment of two months' duration, and to maintain three more beds for four months further treatment for patients who appeared likely to benefit by this longer stay.

During 1905 there were 21 patients admitted to the beds subsidised by the Council, and 18 were discharged. Up to June 30th, 1905, 20 patients had passed through the Council's beds, and of these eight have since died and 12 were living at the date when the annual report for 1905 was written. Two of the eight who died proved to be very acute cases and were sent home after a few weeks stay as they seemed to be getting worse. The others were all temporarily improved by the open-air treatment, but soon relapsed after returning home. One went to another sanatorium. Of the 12 patients supposed to be alive one was last heard of in March, 1905, and one in August, but the other 10 had been heard of in 1906, before Dr. Davies had completed his annual report for 1905. All but one was at work; he was "feeling excellent" but out of employment. Two have gone to Canada and are doing well. One is employed in the Peppard Sanatorium. Two women are in service, and one is performing her household duties at home. One states that "cough got worse after leaving sanatorium, but having found work in the country it is disappearing, otherwise have enjoyed good health." Five appear to be temporarily cured and have

no symptoms ; the other seven are all in improved health. Dr. Davies summarises the results as follows :—

Five apparently cured.

Seven much improved and able to resume work.

Eight died.

Commenting upon these results, the Medical Officer of Health states :—

As it is possible that some of the seven improved will presently relapse, it is a question whether the curative results can be considered quite satisfactory, but the educational results have been found altogether good. Those who have returned from the sanatorium have always been found to continue to carry out open-air treatment at home, and to take the other precautions, such as sleeping in a separate room, necessary to prevent them infecting others. These precautions can only be very partially taught by the distribution of printed instructions and by visits to the homes. It is a question whether it would not be better to further reduce the period of stay at Peppard (Maitland Cottage), for all but selected cases, to six weeks or a month, in order to educate a larger number of consumptives.

ST. MICHAEL'S FREE HOME FOR CONSUMPTIVES, AXBRIDGE, SOMERSET.

This Home, which is situated a short distance from Axbridge, and which is intended for consumptive patients who are members of the Church of England, was built and endowed by the late Mrs. William Gibbs, of Bristol, in 1878.

The institution which provides accommodation for 41 patients, 24 men and 17 women, is under the care of the sisters of St. Peter's Community, St. Peter's Home, Kilburn.

The Home is intended for patients who need medical treatment and care, and not for persons who are considered to be incurable.

The condition of each case is considered from time to time and patients whose physical condition holds out hope of improvement are allowed extended treatment if their conduct has been satisfactory.

All applications relative to this Home need to be made to the Sister in Charge, St. Michael's Home, Axbridge, Somerset.

THE ENGEL HOME, CHEDDAR.

This Institution is connected with St. Michael's Home, Axbridge, and is under practically the same administration.

It is intended for—

- (a) Gentlewomen of limited means in the first stages of phthisis.
- (b) Women of a poorer class, servants, etc., in a similar condition of ill-health.

Patients of class (a) pay 20s. to 30s. weekly and are provided each with a separate room; those of class (b) pay 10s. to 12s., inclusive in each instance of medical attendance. Personal laundry expenses and stimulants are charged as extras.

The Matron of the Home is a fully certificated medical nurse and the patients are under the care of a local medical practitioner.

MALTINGS FARM SANATORIUM.

(Opened 1901.)

The foundation of this institution was due almost entirely to the initiative of Dr. Jane Walker, of 122, Harley Street, London, who for several years past has taken a very active interest in the problem of providing sanatoria for the poorer classes.

The institution in question is situated on a relatively elevated position near Nayland, in Suffolk, at a distance of some 3½ miles east of Bures, from the station (G.E.R.), of which town the sanatorium is easily reached.

The site upon which the sanatorium stands is a portion of 100 acres of land belonging to the East Anglian Sanatorium, a private institution intended for patients of the well-to-do-classes.

Although these two sanatoria are upon the same estate, the two series of buildings are distinct institutions, separated from one another by an intervening hill, and administered by separate staff.

Use of the Maltings Farm buildings for consumptive patients of the male sex since 1901, afforded experience which was regarded as sufficiently encouraging to justify in September, 1904, an extension of the work to females. The total accommodation of the institution now comprises 16 beds for men and 16 for women.

The special feature of this institution is that it has been founded and is conducted upon thoroughly economical lines. The accommodation for male patients was in the first instance

that afforded by Maltings farmhouse, which was modified in certain minor details to fit it for the purpose. This farmhouse is still used as part of the sanatorium, but a wooden bungalow has been since erected to provide accommodation for eight additional patients, while the original day and dining room has been converted into a ward. Accommodation is also provided in this house for the resident medical officer. Extension of the institution was facilitated by the modification of the farm barn in such a fashion as to render it suitable for a dining-room both for the male and female patients, the alterations of the barn having consisted mainly of tiling the roof, inserting large windows in the walls and limewashing the interior. The floor has been rendered damp-proof by a thick layer of concrete. The walls consist simply of one thickness of boarding, there being no inner lining.

Further administrative accommodation has been secured by converting the coachhouse, carthouse and stables into kitchen, scullery and other offices.

The special bungalow accommodation for females is well shown in the accompanying photograph, which also shows the barn used as a dining-room, and the back of the kitchen premises.

The bungalow consists of a wooden building erected on concrete pillars, the accommodation comprising three sets of two cubicles, each cubicle holding two patients. At the eastern end of this building is what is termed an "observation ward," which is utilized for the observation of recently arrived cases, which are in the first instance confined to bed.

At the western end of the building is a day room for the patients, while in the rear of the building at either end is a nurses' bed and sitting room, and in the centre a small ward kitchen and the lavatories.

The cubicles are so arranged that when the folding doors on either side of the building are open there is a complete through current of air; there being, in addition, openings both above and below the "ceiling" which can never be closed.

The whole of this building is lined with matchboarding, and no artificial warming of the cubicles has hitherto been found necessary. In front of the building is a spacious verandah on to which the beds can be wheeled in fine weather.

The roof of the whole building is of "ruberoid" material.

Excrement is disposed of at the institution by means of earth closets, and the slopwater is conducted to a cesspool, from which it is pumped on to a remote portion of the site.

Lighting is by means of electric light supplied from the plant of the East Anglian Sanatorium.

The cost of the female portion of the institution, including a half share in the cost of the conversion of the barn into a dining room, and of the stables, etc., into kitchen accommodation, was

£110 per bed. This is, however, exclusive of the cost of the site, which is rented from the East Anglian Sanatorium.

The two-bedded cubicle principle has been adopted partly from motives of economy as regards cost and administration, but largely owing to the opinion of the medical director that the class from which the poorer patients are drawn is averse to the solitude of a single ward, very few of such persons having been accustomed to a separate sleeping apartment.

The weekly charge at this sanatorium is 1 guinea for women and from 30s. to 2 guineas for men; the charge of 30s. being in respect of such males as are able to be out of bed during the whole day.

The difference in the charge made for male and female patients is due to two causes. In the first place the female section of the sanatorium having been provided by subscription, no capital outlay has been involved in this connection, and, hence, no sinking fund and interest have to be paid; whereas, as regards the male portion of the institution rent has to be paid to the East Anglian Sanatorium. The second cause for the excess of the male over the female maintenance is the fact that the women are more willing to help in the work of the institution than is the case with the men. Moreover, the females eat less than the males.

Dr. Walker informs me that the actual cost per annum is for males £58 and for females £43, an amount which makes no allowance for depreciation of buildings, etc.

Employment of Patients.

Some difficulty has been found in the past in inducing the male patients to perform any routine work, a fact which appears to be due to the circumstance that patients who are paying, or having paid for them, a weekly contribution, fail to appreciate the importance of becoming re-accustomed to work before leaving the institution. They regard the work done by them as something for which they should be paid, and see no advantage to themselves apart from the financial considerations. I have found the same tendency in other institutions of a similar character.

But notwithstanding this fact Dr. Walker has been able to organise a system of work in certain directions.

There is in connection with the whole estate a lady sub-gardener and manager of industries, who is able to teach the female patients pillow-lace making, an industry in which many of the patients have taken an active interest. The sewing of plain linen for a London firm also provides employment, and the sanatorium is willing to undertake more work of this character.

Basket-making has also been attempted, but hitherto with no great measure of success owing to the fact that the work is somewhat hard and the men who have learnt it leave the institution too soon to enable a systematic industry to be founded.

MALTINGS FARM SANATORIUM.



To the right the farm house used partly for administration and partly for patients: to the left part of dining barn; and, between the two buildings, the bungalow for six male patients.



Bungalow for female patients, barn used as dining room, and the kitchen premises.

Poultry rearing is also beset with difficulties owing to the fact that the patients are for the most part unversed in such occupations, but, nevertheless, the accounts under this heading show a small balance.

The East Anglian Sanatorium has been able to employ some of the convalescent patients from Maltings Farm, and other patients are being taught gardening by the under-gardener. One of the women patients is now a probationer at Maltings Farm, and another is parlourmaid at the East Anglian Sanatorium.

All the work above referred to is, of course, carried out under medical supervision; and the medical director in the last annual report relative to the sanatorium points out that it is obviously useless to pronounce a man fit for work on discharge unless he has been employed while within the sanatorium. It would be well if in compiling sanatorium statistics this fact was more generally held in view.

THE BROMPTON HOSPITAL SANATORIUM AND CONVALESCENT HOME.

(Opened June, 1904.)

This institution, which was opened by their Royal Highnesses the Prince and Princess of Wales, owes its existence in a material degree to the circumstance that the public having grasped the fact that tuberculosis may, under certain conditions, be communicable from person to person, the greatest difficulty has been experienced in procuring accommodation in existing Convalescent Homes for patients discharged from the Brompton Hospital.

This difficulty led in 1897 to a determination on the part of the Managing Committee of the Brompton Hospital to erect a Convalescent Home in memory of the jubilee of Queen Victoria, and in consequence of the demand for the open-air treatment of pulmonary tuberculosis such Convalescent Home has taken in fact the form of a Sanatorium. A careful and prolonged search was made for a site, and, after considering many places in Surrey, Kent, Middlesex and Buckinghamshire, the present situation was selected.

This site, which is 20 acres in extent, is situated on the Chobham Ridges, Surrey, at an elevation of 400 feet above sea level, distant three miles from Frimley and four from Farnborough station.

The grounds, which face south, are thickly clothed with numerous varieties of pine tree; geologically they are composed of the sands and gravels of the Upper Bagshot Beds.

From the Sanatorium an extensive view extending away to the Hogs Back and Crooksbury Ridges is obtained.

The Sanatorium.

The Sanatorium establishment, for much information concerning which I am indebted to Dr. M. S. Paterson, the Medical Superintendent, is arranged in a fashion which is quite unique in so far as English Sanatoria are concerned, and I have seen no institutions abroad which are constructed on quite similar lines. The accompanying plates afford a good idea of the grouping of the buildings. It is situated at an elevation of 380 feet above sea level.

The establishment consists of what for descriptive purposes may be regarded as three groups of buildings.

- (a) A sanatorium group,
- (b) An administrative group,
- (c) A machinery group.

(a.) The Sanatorium group consists of an oblong central block of three stories; from each of the four corners of which there radiates out a two-storied pavilion, which provides accommodation for patients. The upper portion of these buildings are tile-hung, a provision which, while affording protection from damp, imparts to the Sanatorium a peculiarly pleasing appearance quite unlike that conveyed by many other public institutions of this nature.

The central block comprises on each of the first two floors a reading room, two wards for three beds each; and, in addition, certain administrative offices, such as a consulting room, dispensary, matron's room, waiting room, &c. From the eastern and western ends of the block, but separated therefrom in each instance by a passage with cross ventilation, is an annexe which provides bath room and lavatory accommodation. On the third floor are bedrooms for the female servants.

On the southern aspect of the ground floor of this block is a raised terrace, while on the northern aspect is the main entrance.

The four pavilions are almost identical in character; except that the two northern pavilions are provided with nurses' rooms, lavatories, and staircases to the upper stories, whereas the southern pavilions are not thus provided. Each pavilion comprises on each floor the following accommodation, the cubic space per bed being over 1,300 cubic feet :—

A ward at each free end for	...	...	3 beds.
A ward near the central block for	...	2	"
Six intermediate wards for	...	...	1 bed each.

i.e., there are eleven beds on each floor of each pavilion, and in the central block two wards for three beds on each floor, making total accommodation as follows :—

Each pavilion, 22 beds	...	...	...	88
Central block, 6 beds on each floor	...	...	...	12
				100*

* In June, 1907, there were in all 108 beds : 78 for men and 30 for women.



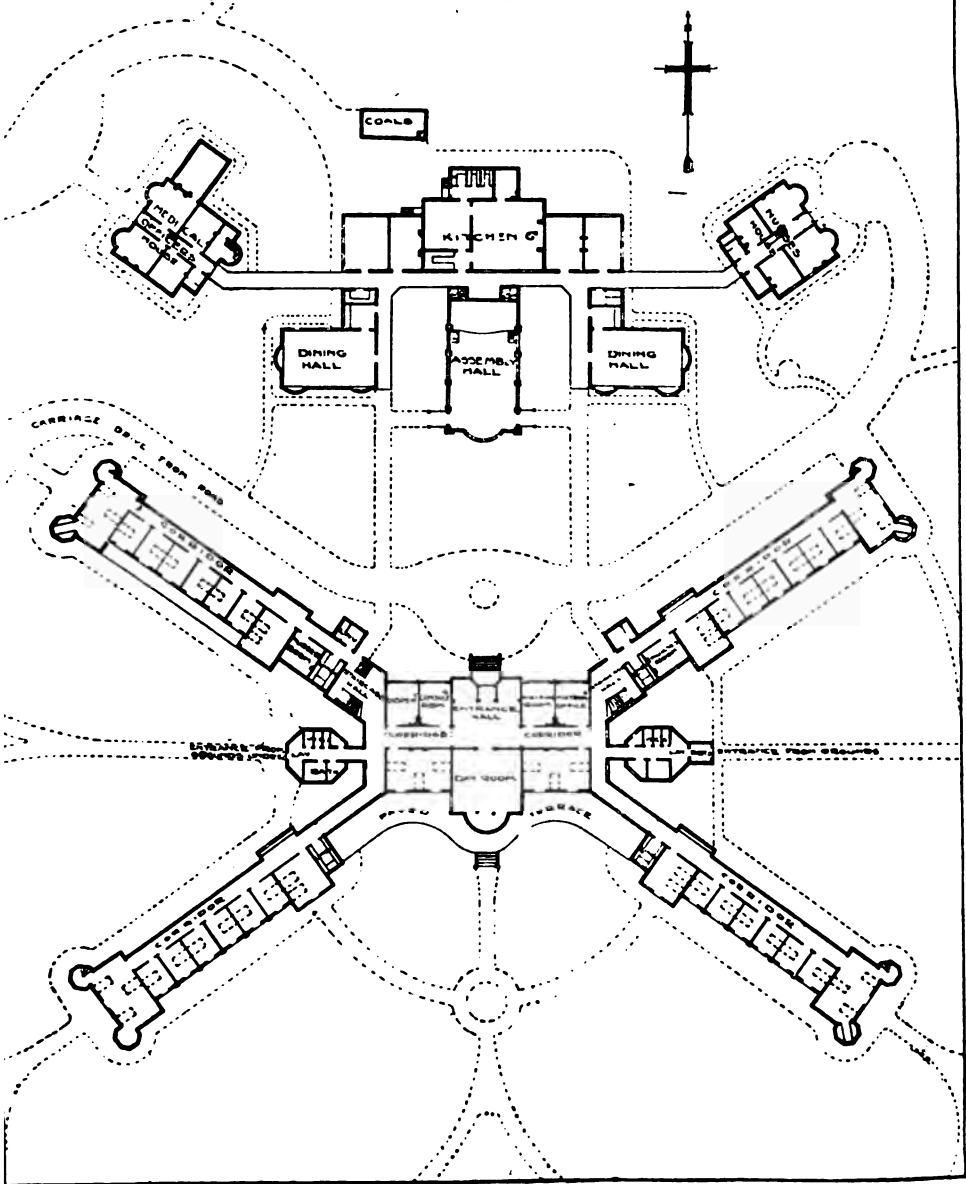
(To face page 466.)

BROMPTON HOSPITAL. SANATORIUM AND CONVALESCENT HOME HEATHERSIDE.

Note: There are other buildings not shown Laundry Engine and Boiler Houses, Mortuary Laboratory and Liegenhallen for Male and Female Patients

ABOUT 20 ACRES OF UNDULATING GROUND COVERED WITH PINE TREES

Scale of Feet



(To follow plate facing page 466)

1935

The pavilions are arranged in the usual manner, *i.e.*, the wards face towards the south, while a corridor behind faces to the north, and affords access to the wards on this side. There is a balcony and a fire-escape staircase at the end of each pavilion, while in addition two of the pavilions are cut off from the central block by a corridor constructed of fire-resisting material. In front of the ground floor of each pavilion is a terrace on to which the beds may be easily wheeled, and a considerable number of the patients sleep on this terrace.

Ventilation of the wards is amply provided for by French casement windows reaching to the floor and fanlights reaching to the ceiling, while over each door is a fanlight affording through ventilation to the wards at all times.

The administrative group, which is erected to the north of the central block just described comprises the following separate buildings—

- A medical officer's house,
- A nurses' home,
- A spacious assembly room,
- Two dining rooms.
- Kitchen with the accessory offices.

The machinery group, which is situated to the west of the main buildings, comprises the laundry, the electric plant, the engine house, mortuary and laboratory.

The water supply is derived from the Frimley Water Works, and the drainage is connected with the Frimley sewers.

Warming is by means of hot water radiators, there being a sheet of metal above each radiator to divert the heated air and thus prevent the blackening of the walls in the vicinity. Lighting is by means of electricity generated on the premises.

The Architect was Mr. Edwin T. Hall, F.R.I.B.A., and F.S.I., of 54, Bedford Square, W.C.; the Contractors were Messrs. Holliday and Greenwood, of London.

Objects of the Sanatorium.

The objects of the Committee of the Brompton Hospital in erecting the Sanatorium were threefold—

Firstly, the open-air treatment of early cases of pulmonary tuberculosis, with a view to a definite arrest of the disease.

Secondly, the education of patients in the open-air treatment, and in general principles of hygiene, and

Thirdly, the provision of a Convalescent Home for patients treated in the Brompton Hospital. One wing of the institution is to be set apart for this purpose.

Method of Admission of Patients.

A patient attends the out-patient department of the hospital in London, where his disease is diagnosed and he is, if it is thought desirable, advised to enter the Brompton Hospital. If after observation in the wards, the patient is thought to be a suitable case, he is recommended by his physician for transfer to the Sanatorium, and is kept in the hospital until a vacancy occurs there. As is stated in the annual report for 1906.

The greatest care is exercised in selecting only those cases who are likely to derive the greatest amount of benefit from a personal course of treatment at the sanatorium which usually extends over several months.

Patients are not admitted direct to the Sanatorium, but only through the Brompton Hospital, and only patients unable to pay for treatment are received.

Cost of Construction and Maintenance.

The cost of the institution was approximately £70,000 i.e. the cost per bed was £700.

The cost, exclusive of interest on the capital expended, is about £70 per bed, which includes all charges for maintenance; of this sum about one-third is spent on food for the patients.

The Exercise and Employment of Patients.

Well organised efforts are made at this institution in encouragement of patients such as are capable of it, to perform work of gradually increasing severity. The system under which this work is carried on has been thought out and is superintended by Dr. Paterson, who evidently takes the greatest interest in the subject.

For purposes of classifying the patients there are seven different grades into which the exercise and work have been divided.

The first and easiest grade comprises walks of definite duration along what is known as the "measured mile," a walk which traverses the pine woods in the grounds and which is well sheltered throughout. If no untoward results follow these exercises the patient is shortly allowed to collect firewood or to perform some other equally light task, this forming the second grade of employment. In the next grade patients are allowed to carry baskets of firewood from the woods to a given locality, and in the fourth grade the weights to be carried are gradually increased, such weights consisting of wood, gravel, or other material according to the work which may be in progress in the grounds at the time. Those patients who stand this employment well are passed on after a time to the fifth grade in which they perform work such as digging over already broken ground; this being regarded as a materially lighter burden than the breaking up of unbroken



E.

(To face page 468.)

ground which is the sixth grade of labour. In the seventh and last grade the patients are engaged in such relatively hard work as using a light pick and wheelbarrow, rolling the lawn, or making paths through the woods.

The patients are kept at work in practically all weathers in sun, rain, and wind, working on an average about four and a half hours a day, and they are not allowed indoors except for meals and rest hours until 7 p.m. without special permission. During, however, the fortnight prior to leaving the institution they work some six and a half hours daily in order that their capacity for labour of average severity may be tested while the patients are still in the institution. It is explained to them that if they break down while performing this harder work it is far better for them that they should do so while still in the sanatorium rather than after they have left it and their beds have been filled up.

It should be added that Dr. Paterson aims at securing a condition of physical fitness in the patients and that he does not lay much stress after a certain point upon mere increase of weight. He regards the increase of weight as but one of the factors making for return to normal condition, and he thinks that the importance of increase of weight may easily be exaggerated. He endeavours so far as practicable to raise the patient to what may be termed his normal weight in health, but he aims more particularly at securing what may be regarded as an economical cure. Many of the patients lose weight on first taking to work, but by gradually accustoming them to the work it is found that this temporary loss is soon made good.

In this connection it may be pointed out that Dr. Paterson abstains from anything which might be regarded as "stuffing" in the feeding of the patients. If a patient on seeing his plate of food thinks that it is beyond his power he is allowed to take his plate to the Medical Superintendent and ask for a smaller portion. But whatever the patient accepts he is compelled to finish.

In addition, however, to the above set tasks many minor duties devolve upon the patients, the constant performance of which prevents anything approaching *ennui*, and which tends to keep them from brooding upon the malady from which they are suffering.

Each patient is expected to clean his own bedroom every day and to wash it twice weekly, while the making of his bed also devolves upon him. By way of facilitating this latter task the patients are grouped into couples so that each bed is made by two patients. These duties, as also the polishing of all brass-work, have to be performed between 9 and 10 a.m.

The patients have also to clean the dining halls, lay the tables and wash up their own plates, knives, &c. In order to prevent difficulties during the washing-up process the patients are

grouped according to the tables which they occupy, certain groups commencing their meals a few minutes in advance of other groups (*see* "Daily Routine"), so that all crowding during the cleaning of crockery, &c., is prevented.

The plates, &c., belonging to each patient are duly numbered, and these when cleansed, are placed in a rack the several divisions of which are also numbered. It is estimated that in so far as household work is concerned the labour of the patients saves from three to four wardmaids, and it is proved by experience that the patients break far fewer plates than the wardmaids. The patients also help to economise the labour of the staff in dealing with the sputum flasks. The sputum is collected in numbered Dettweiler flasks during the day and in specially designed sputum cups (also numbered) during the night, there being a wire easily sterilisable rack in each corridor in which the used cup is deposited in the morning, and from which the clean Dettweiler is then taken. The racks are collected by the sputum porter, the flasks and their contents being thoroughly sterilised in a sterilizer specially designed by Dr. Paterson, and in which the disinfecting agent is steam under pressure.

The whole of the soap used in the institution is made in the laundry from the refuse kitchen fat.

With respect to the work of the patients in the grounds, it may be pointed out that the alterations which have taken place since this Sanatorium was opened have all been carried out by the patients, and that the lawns, paths, borders, &c., in these extensive gardens are almost entirely kept in order by the patients; the only gardener employed being engaged rather in superintendence than actual work. The paths through the wood have been made by the patients, as also have some useful and extremely economical shelters.

The following work has been carried out by the patients since the opening of the Sanatorium :—

1. Digging, manuring and sowing over an acre of grass.
2. Excavating for the walls of a new reservoir to hold 500,000 gallons of rain water, and mixing and laying about 650 tons of concrete.
3. Making most of the paths.
4. Laying the concrete walk to the dining hall.
5. Making a concrete subway 150 yards in length, from the engine room to the kitchen.
6. Clearing a 20-foot "fire zone" round the boundary.
7. Trenching and sifting about an acre of land.
8. Getting and sifting gravel for the paths.
9. Making the terrace and rock garden round the tennis court by the Medical Officer's House.
10. Making the bank round the grounds.
11. Felling and cutting into firewood about 100 trees.

In estimating the amount of work done Dr. Paterson points out that not more than 20 per cent. of the men at one time are ever fit for hard work ; and that men doing light work only contribute a small share to the whole.

The amount of land connected with the Sanatorium is, as has been said already, 20 acres. Such an area has apparently proved sufficient to provide employment and exercise for the patients up to the present. Dr. Paterson told me, however, in answer to my inquiry, that he thought larger grounds would be desirable in order that the patients might by their own labour provide garden produce for the institution. As regards work in the winter months, industries such as basket, mat and broom making have been developed.

It is, however, of importance to observe here that no such general and systematic method of employing the patients would be feasible were it not that the existence of the Brompton Hospital in London renders it possible to select suitable and promising cases. Dr. Hector Mackenzie, one of the Visiting Physicians, who was good enough to take me to the Sanatorium with him, told me that, so far as he is concerned with the work of selection at Brompton Hospital, no advanced cases are sent to the Sanatorium. It is well that this distinction should be borne in mind, as where an institution is supplied direct with patients from the public or from a Poor Law Infirmary it would be difficult to apply in its entirety a system such as that which obtains at this Sanatorium.

Determination of the length of stay of each patient rests entirely with the Medical Advisers. Dr. Paterson is of opinion that a stay of three months is insufficient, generally speaking, to bring about a permanent restoration to working capacity even in quite early and suitable cases, and he thinks that efforts should always be made to secure a stay of at least six months. Considerable pressure is often necessary in order to retain a patient, but Dr. Paterson points out to him that it is much better that the relatives shall, if necessary, go into the Work-house for a few months until the restoration of the patient to working capacity is complete, than by leaving the Sanatorium too early the whole family should be thrown permanently on the poor rates.

Efforts are made, so far as practicable, to keep the sexes from co-mingling, and in order to facilitate this there are separate paths for patients of each sex. Those for the males are staked out in red, those for the females in green.

During the week the patients are confined to the grounds, but on Sundays those whose conduct has been satisfactory are allowed to go beyond the grounds between 2.30 and 4.45.

The daily routine of the patients may be gathered from the accompanying time-table. Smoking is allowed in the main road of the Sanatorium for a quarter of an hour after meals.

BROMPTON HOSPITAL SANATORIUM.

Daily Routine.

6.5.	...	Rise, and turn down beds and proceed according to "Morning Routine."
8.15	...	Breakfast for tables 1, 2, and 3.
8.30	...	Breakfast for tables 4, 5, and 6.
9.30—9.55	...	Indoor work.
10	...	Outdoor work or exercise.
10.50	...	Lunch.
11	...	Outdoor work or exercise.
12—12.45	...	Absolute rest for tables 1, 2, and 3.
12—1	...	Absolute rest for tables 4, 5, and 6.
1 p.m.	...	Dinner for tables 1, 2, and 3.
1.15	...	Dinner for tables 4, 5, and 6.
2—2.45	...	Absolute rest for tables 1, 2, and 3.
2.15—2.45	...	Absolute rest for tables 4, 5, and 6.
2.45—4.35	...	Work or exercise in grounds.
5	...	Tea for tables 1, 2, and 3.
5.15	...	Tea for tables 4, 5, and 6.
5.50	...	Temperatures taken for tables 1, 2, and 3.
6.5	...	Temperatures taken for tables 4, 5, and 6.
6—7.45	...	Read papers, write letters, play games, &c.
7.45	...	Supper for tables 1, 2, and 3.
8	...	Supper for tables 4, 5, and 6.
8.40	...	Prayers.
8.45	...	Bed.
9.15	...	Lights out.
9.30	...	Silence.

Sunday Routine.

The routine is the same with the following differences :—
There is no work.

9.30—10.35	...	Patients walk two miles all weathers.
11	...	Divine Service.
12	...	Rest hour.
2.30	...	Those patients who have permission may walk outside the Sanatorium until 4.45.

A quarter of an hour is allowed for smoking after each meal.

Patients are not to walk past the red stakes.

Patients are not to walk on or across the grass without permission.

A quarter of an hour is allowed before each meal for washing.

Patients are not allowed indoors except for meals and rest hours until 7 p.m. *without special permission.*

Patients may use the concert hall and reading room from 7 p.m. until prayers.

Results.

No detailed medical report relative to the patients treated in this sanatorium has as yet been published, but the sixty-sixth annual report relative to the Hospital for Consumption at Brompton comprises the figures relative to the sanatorium, of which the table here given is a summary.

Table relative to the Immediate Results of 187 Patients Discharged in 1906.

Total discharge.	Total arrest.	Much Improved.	Improved.	Left at own request.	Insub-ordinate.	Unimproved or worse.	Not Tuberculosis.	Died.
187	110	21	25	6	3	17	4	1

As regards the use of the term "total arrest," the annual report already referred to states that "no male patient has been considered to present total arrest of the disease until all bacilli have disappeared from the expectoration, and medical examination has failed to detect any sign of active mischief, and also until he has performed the highest grade of exercise for a fortnight or three weeks without rise of temperature or loss of weight."

It is of interest in estimating the value of these statistics to have regard to the fact that apparently all the patients had before admission to the sanatorium undergone a preliminary trial of treatment at the hospital in London, and that they had for the most part already reacted favourably to such preliminary treatment. It is also well to note that the average length of stay in this sanatorium was for "arrested" cases, 176 days; for "much improved" cases, 154 days, and for "improved" cases, 112 days.

The report above referred to which was presumably issued in September, 1907, furnishes the following data relative to after-results, *i.e.*, to the condition of patients who had been discharged from 8 to some 20 months.

Condition on discharge.				Condition at time of enquiries.			
				At work.	Not at work.	Failed to report.	Dead.
"Total arrest"	110	...	...	93	5	12	—
"Much improved"	21	...	...	10	7	4	—
"Improved"	25	...	...	10	7	7	1
Total	156	...	...	113	19	23	1

It will be observed that the above table relates to only 156 of the total 187, or (omitting the 4 non-tuberculous cases) 184 discharged during 1906 or, stated differently: of 184 cases discharged, 113 or 61·4 per cent. were at work at intervals of from some 8 to 20 months.

The annual report for 1906 states that a more detailed scientific report will probably be offered to the Committee of Management at the end of 1907, by which time the sanatorium will have been open for three and a half years. These figures will be awaited with the greatest interest, since the results obtained at this sanatorium should certainly show what may be secured by the application of the most modern methods, *i.e.*, rigid selection of "suitable" cases after a preliminary period of trial as regards what may be termed the "reaction equation" of the patient; retention at this sanatorium for as long a period as may be thought desirable and, lastly, a process of gradual inurement to work of increasing grades of severity under a system as complete as modern knowledge and effective discipline can make it. These are conditions which can be obtained at very few sanatoria, and the results in so far as average sanatorium practice is concerned must be regarded as almost ideal.

EVERSFIELD HOSPITAL, ST. LEONARDS-ON-SEA.

(Founded, 1884.)

This institution, which comprises in-patient and out-patient departments, was inaugurated by Dr. Thomas Gambier many years ago under the name of the "Friedenfels Home." The existing buildings have been in use about 17 years. The hospital is situated in West Hill Road, St. Leonards, in an elevated situation overlooking the sea, and affording fine views of the south coast.

The accommodation afforded consists of general and of private wards; in addition, there are a few beds arranged as cubicles, curtains being employed to secure the necessary privacy.

The total number of beds is 55, namely, 47 in general wards and eight in private wards. There is a verandah overlooking the sea in front both on the ground and the first floors, and on these a certain number of beds are placed when possible.

Electric light has been recently installed and other improvements effected, and it is shortly proposed to extend the accommodation and to provide additional shelters in the garden.

Patients are admitted from all parts of the country. In 1905, of a total 352 admitted, no fewer than 164 came from London and its suburbs, and 60 from Birmingham.

During the same year 2,044 out-patients were treated.

Conditions of Admission.

Efforts are made, so far as practicable, to limit admission to early cases of pulmonary tuberculosis ; but, as is the case in other institutions of the kind, it has been found difficult to exclude cases in the more or less advanced stages of the disease.

Admission is partly by subscribers' letters and partly by payment. Subscribers of one guinea are provided with one in-patient's letter and four out-patients' letters. Each in-patient's letter nominates one patient for four weeks' stay in the institution, each out-patient's letter secures out-patient treatment for the same period.

Patients who are furnished with an in-patient's letter pay 13s. weekly, patients without such letters 17s. weekly.

The charge for a cubicle is 25s. weekly, that for a private ward 2 guineas weekly—the charge in all cases being quite inclusive.

In the out-patients' department patients without a subscriber's letter are accepted on contributing a small weekly sum during the period of treatment. Really necessitous patients are treated gratuitously.

The institution, which is now vested in Trustees, is purely philanthropic in its operation, and the Honorary Physician and Resident Medical Superintendent, Dr. Thomas Gambier, who was good enough to show me over the hospital, accepts no payment for his services.

THE FAIRLIGHT HALL CONVALESCENT HOME, HASTINGS.

This institution has been established in connection with the Margaret Street Hospital for Consumption and Diseases of the Chest, which is a hospital for out-patients only.

Admission to the Home, which is for males only, is by means of a Subscriber's Letter. A patient furnished with this recommendation is called upon to pay only 11s. 6d. per week ; without such letter the charge is 15s. weekly.

A Subscriber's Letter is available for six weeks, and if in the opinion of the Honorary Medical Officer a further stay is desirable, another Letter must be procured.

During 1905, 166 persons were admitted into the institution as against 153 in 1904. Of the 166 there were 155 who were suffering from chronic pulmonary tuberculosis, and most of these greatly improved during their stay in the Home.

The average stay of each patient was 5½ weeks.

Letters of recommendation are distributed in accordance with the following scale :—

A subscriber of ten guineas per annum receives six letters, and is entitled to recommend six patients.

A subscriber of five guineas receives three letters, and can recommend three patients.

A subscriber of two guineas receives one letter, and can recommend one patient.

Candidates who are waiting for admission to the Home may attend as out-patients at the Margaret Street Hospital until they can be admitted to the Home.

All applications for admission should be made to the Secretary of the Margaret Street Hospital for Consumption, 26, Margaret Street, Cavendish Square, London, W.

Up to 1905 this institution was situated at Worthing, but in that year, the lease having expired, and there being much prejudice against Homes for Consumptives in the neighbourhood, the institution was removed to Ore, near Hastings, where a former private residence was taken on a short lease.

The existing Home occupies an elevated and open site of some 3½ acres in extent a short distance to the north of Hastings, and the house, which faces south, commands extensive views over the surrounding country and of the Channel.

The total accommodation available in 1906 was 22 beds, as compared with 16 at Worthing.

KING EDWARD VII. SANATORIUM.

(Opened June 13th, 1906.)

The establishment of this institution arose out of the great interest which His Majesty the King has manifested in the subject of sanatoria both in this country and abroad. A large sum of money having been placed at His Majesty's disposal for some philanthropic purpose, he elected to employ it for the good of his subjects by the erection and endowment of a sanatorium for a class of the community for which up to the present time no adequate provision has been made. This class comprises persons who, while ranking above the poor, are quite unable to meet the charges made at most private sanatoria, but who are nevertheless not suitable subjects for philanthropic institutions intended primarily for the very poor.

There can be no question as to desirability upon general social lines of a provision of this sort. Persons comprised within the class referred to include many individuals who are doing admirable scientific, administrative and educational work in the community, and who are to be regarded as representatives of a section of the population especially deserving of consideration.

The accommodation in this sanatorium is, therefore, devoted to persons of a less well-to-do class who are able to afford some two guineas a week.

The character of the buildings which now constitute the King's Sanatorium was determined upon after careful consideration on the part of the advisory committee appointed by His Majesty.

This committee consisted in the first instance of Sir William Broadbent, Sir Richard Douglas Powell, Sir Francis Laking, Sir Felix Semon, Sir Herman Weber, and Dr. Theodore Williams; subsequently there were added Sir Frederick Treves, Colonel Lascelles, Lord Sandhurst, Mr. William James, and Mr. Bailey. Dr. Horton-Smith Hartley and Dr. John F. H. Broadbent were appointed secretaries.

In order to elicit as many original ideas as practicable, and to encourage the study of sanatoria from the medical and architectural aspects, His Majesty offered three prizes of £500, £300, and £100 respectively for what the committee might regard as the best essays and plans upon the construction of these institutions. The prizes were eventually awarded to three selected essays* from among those submitted by the 180 medical men and architects who took part in this competition; and the essays as a whole were instrumental in affording the advisory committee much useful information. It was considered, however, that no one of the essays could in the present instance be conveniently followed *in extenso*; consequently, Mr. H. Percy Adams, F.R.I.B.A., was selected as the architect to draw up plans for the sanatorium. After a long and thorough investigation, involving an inspection by some of the members of the advisory committee and the architect of the best sanatoria in Germany and Switzerland, the plans from which the sanatorium has been erected were finally decided upon.

The site upon which the institution stands is one of exceptional beauty. It comprises some 150 acres of land situated on the southern slopes of Easebourne Hill, being part of the Cowdray Estate near Midhurst, Sussex. It is situated at an elevation attaining a maximum of 630 feet above ordnance datum, and is bounded on the west by Pound Common, on the north and east by the Cowdray Estate, and on the south by Hollist Common. The site is in fact nearly conterminous with what is marked as Lords Common on the ordnance map, and it can be reached either from Haslemere or Midhurst stations, being distant by road some seven miles from the former and four miles from the latter, the approach *via* Haslemere passing through very attractive scenery.

* *First Prize.* Dr. Arthur Latham (London), with whom was associated as architect, Mr. William West (London).

Second Prize. Dr. F. J. Wethered (London), with whom were associated as architects, Messrs. Law & Allen (London).

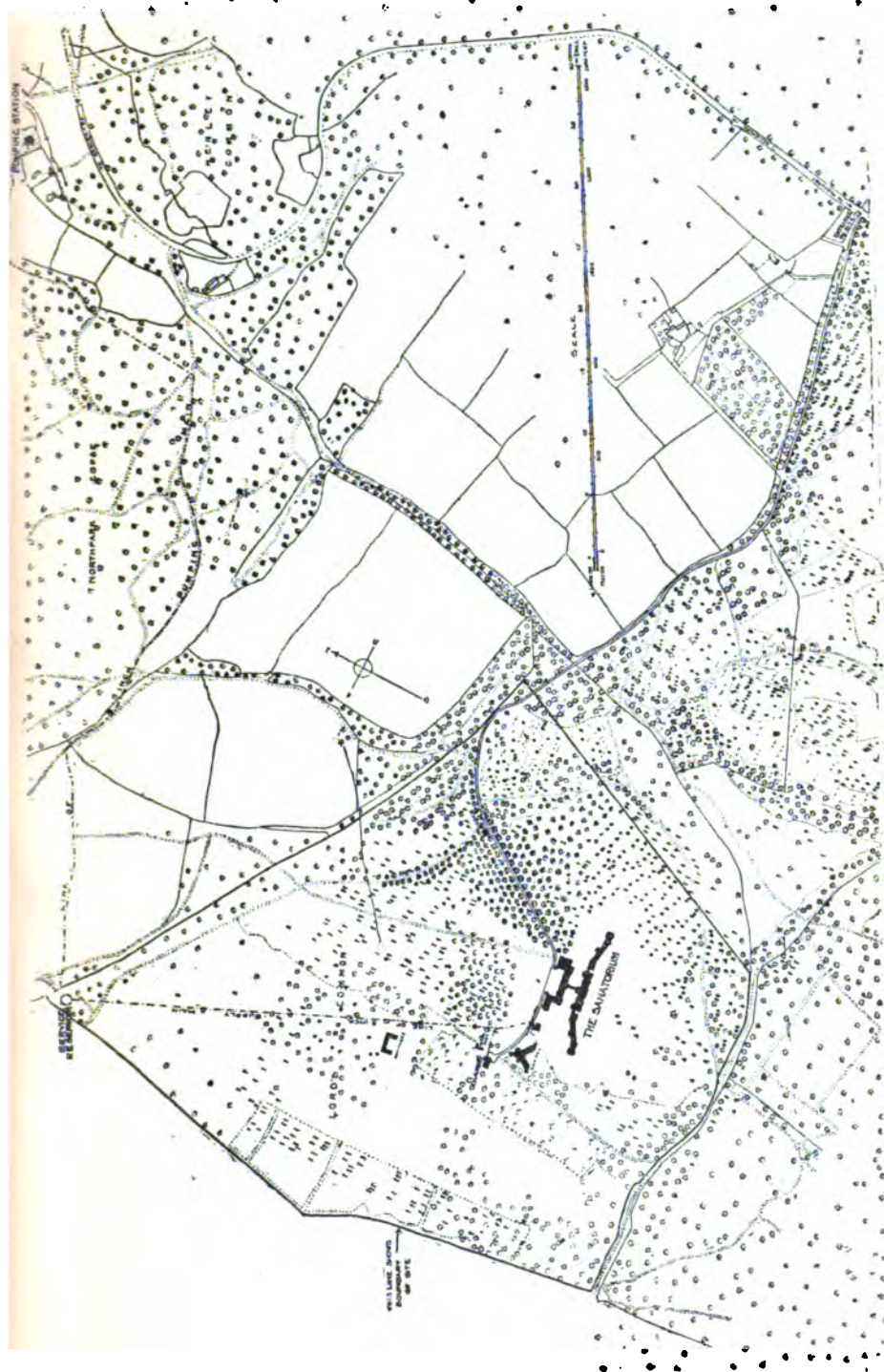
Third Prize. Dr. E. C. Morland (Croydon), with whom was associated as architect, Mr. G. Morland (Croydon).

The area in question, which was purchased from the Earl of Egmont, consists partly of park land and partly of open moorland, while a considerable portion is covered by pine trees.

Geologically the whole of the site is on the Hythe Beds of the Lower Greensand formation, the stone from which has been utilised to some extent in the construction of the sanatorium and in facing the terraces of which the gardens are in part composed. These gardens have been laid out under the supervision of Miss Jekyll.

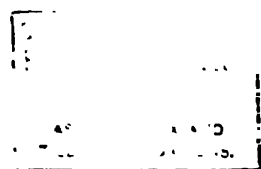
Considerable and unforeseen difficulty was experienced in securing water suitable for drinking purposes, and involved an expenditure which must obviously have enhanced considerably the cost per bed of this institution. Thus, attempt to procure suitable water by boring into the Hythe Beds was unsuccessful owing to the fact that the water obtained therefrom carried up with it so much sand in suspension that the machinery became blocked and damaged, while all efforts to get rid of the sand proved unavailing. Further search was therefore made, and finally water found issuing in springs at a point near Henley Common where the water contained in the Hythe Beds is thrown out by the underlying Atherfield clay, was adopted for supply of the institution. The water from these springs is collected in open channels and conveyed to a covered reservoir capable of holding 60,000 gallons, whence it is pumped by duplicate engines of 16 h.p. through a 4-in. main to the service reservoir situated at the highest point of the site. The capacity of this reservoir is 160,000 gallons; and in order to facilitate prompt delivery of abundance of water in the event of fire in the sanatorium buildings, a main 5 inches in diameter has been carried down to the institution. Moreover, the sanatorium is in telephonic communication with the pumping station, so that pumping in replenishment of the reservoir can be directed immediately if fire occurs. The daily requirements of the sanatorium as regards water are estimated at 20,000 gallons.

The sanatorium, as will be seen by the annexed plan, is situated on a plateau on the southern slope of the site, at an elevation of 494 feet. The laundry and boiler house are in a natural hollow at a lower level to the north-west of the main building, while west of it are the chapel and the pathological buildings. This position of the sanatorium building is advantageous in many ways. It enables the institution to be protected by the rising pine-covered ground to the north, east and west; its relation to the reservoir allows a good head of water to be procured, and it has facilitated the construction of an approach road free from inconveniently steep gradients. To the south of the institution the site is relatively open, and thus there are afforded in addition to the free circulation of air, fine views over the South Downs as far as Chanctonbury Ring. The grounds supply abundant facilities for the construction of paths of a variety of gradients, and hence every facility is



Plan of the Site.

(To face page 478.)



afforded to the patients for procuring the amount and nature of exercise necessary for their several conditions.

The sanatorium is approached by means of a "drive" from the Midhurst road some one-and-a-half miles in length, the greater portion of this distance being on property which is not part of the site of the sanatorium but through which there is a right of way. The actual approach to the sanatorium grounds is guarded by a picturesque porter's lodge.

The main building, as will be seen by the plan annexed, comprises :—

1. An administrative block to the north.
2. The sanatorium proper to the south.

These two divisions are connected by a spacious corridor on the ground floor, above which is a flat roof which can be used also for a promenade if necessary.

The administrative block and the sanatorium are approached by the main entrance from the north, the Royal Arms surmounting the portals, while in the picturesque entrance hall is the foundation stone which was laid by His Majesty King Edward VII., on November 3rd, 1903. Around this central hall on the first floor is a balcony of old world type from which windows look into the dining hall on the left, and from this entrance hall a view can be obtained down the corridor to the south as far as the main patients' entrance situated in the centre of the sanatorium.

The administrative block comprises a central portion and two wings, the ground floor embracing on the east the patients' dining hall, the kitchen, scullery, servants' hall, &c., while on the first and second floors are the servants' bedrooms.

On the west of the central hall (see plan of site) are the porters' lodge, dispensary, consulting rooms and the operating theatre. Above these on the first and second floors, as well as on the second floor of the wing proper, are the matron and nurses' sitting rooms (on the first floor), and the nurses' bedrooms (on the second floor). The western wing itself, so far as the ground and first floors are concerned, is reserved for the use of the medical staff, there being a separate entrance to this portion of the building in the western wing. In this wing are also the committee room and the medical library, this latter containing a billiard table presented by Mr. William James, a member of the advisory committee.

To the west of this wing is a building serving as the pathological department and comprising a mortuary and autopsy chamber, and three research laboratories. This building, although detached, communicates by means of a subway with the main building.

The sanatorium proper is an imposing and artistically conceived building of three stories, arranged in a central and two lateral

blocks, the several parts being connected on each floor by means of a wide well-lighted and well-ventilated corridor facing north, the whole of the wards having a general southern aspect. On the central portion are lofty gables which add to the pleasing appearance of the whole.

The general arrangements of the building as viewed from the south is well shown by the accompanying plate, which is reproduced by permission of the architect, Mr. Adams, from the *Architectural Review* of June, 1906, which contained a full description of the sanatorium from his pen.

The building is constructed of red brick, relieved at intervals by rows of dark blue bricks, with white stone facings; the roof is of red tiles.

The west of the building is for males, the east for females.

On the ground floor of the sanatorium proper there is on either side of the central entrance, on the south, a spacious room for hydro-therapy, comprising dressing compartments and arrangements for douches, &c.; an artistically arranged recreation room, a writing room and a cloak room. Next to the latter there is in each wing the entrance for those patients occupying such wing, *i.e.*, one entrance for males and the other for females. West and east respectively of the male and female "entrance" are the bedrooms, each bedroom being entered from the corridor on the north and opening on the south by means of French casement windows to the balconies whereon the beds can be easily wheeled. These balconies are eight feet in width and are paved with red tiles.

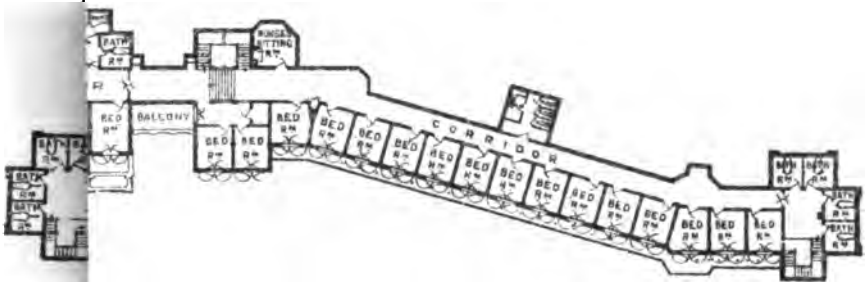
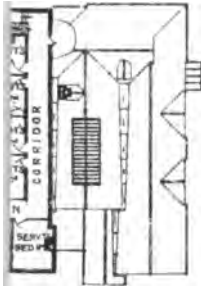
At the end of each wing is a form of annexe, comprising four bath rooms which are lined with white glazed tiles and furnished with white porcelain baths: in each annexe a staircase leads to the grounds. At the rear, about the middle of each corridor, is a sanitary annexe, comprising a lobby, three w.c.'s, and a lavatory. Nearer the centre of the building on each side and likewise at the rear of the corridor is a nurses' room, a staircase leading to the first floor, and a lavatory containing several basins, and two w.c.'s.

On either wing of this ground floor there are 16 bedrooms for patients, each measuring 16 ft. by 11 ft. 6 ins., and having an aspect either in S.S.E. or S.S.W.

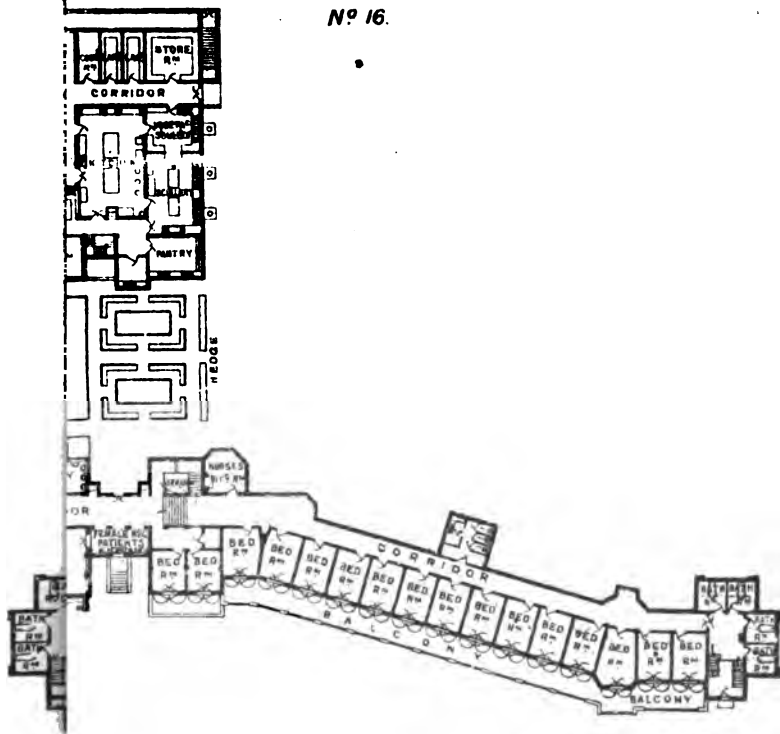
On the first floor of the central block, there is provision for patients who, although not in need of special care and attention, are nevertheless in a condition which calls for quietude and seclusion. It comprises seven bedrooms and one sitting room for each sex (14 bedrooms and two sitting rooms in all), each bedroom measuring 14 ft. by 11 ft. 6 ins. by 11 ft., *i.e.*, a cubic space of some 1,750 feet. All these rooms have a southern aspect and open on the south to a balcony nine feet in width, and so arranged as to afford privacy for each patient, there being an opaque glass screen between each division, access for doctors and

M, MIDHURST.

Nº 18.



Nº 16.



ASTOR LENOX AND
TILDEN FOUNDATIONS.



THE FRONT OF THE SANATORIUM AS SEEN FROM THE SOUTH.

(To follow plate facing page 480.)

nurses being afforded by a door in each screen. There is a separate sun blind over each window which can be easily lowered by the patient in such fashion as to shade the whole of each section of the balcony.

Serving seven bedrooms in each instance of this group, and situated to the north of the adjoining corridor, is an annexe comprising two bath rooms and two w.c.s.

In the wings of this first floor there is further bedroom accommodation for patients.

On the second floor which is confined to the central block and only shown in the general views of the sanatorium there have been placed the rooms for patients who are in need of special medical and nursing attention. This position was selected owing to quietude, accessibility to the medical officer and nurses' rooms, to the passenger lift, and to the kitchen by a special lift connected with the kitchen subway.

In the basement of the building is a subterranean passage carrying pipes and mains, and affording access to all parts of the building, including the pathological laboratory and the laundry.

The balconies on each floor are so arranged as not in any way to obstruct the light to the rooms below, each balcony being as it were set back, *i.e.*, the depth of the building decreases from base to summit in such fashion as to allow of abundance of light and air to each floor.

There are in each wing two hand lifts, one for clean linen and, on occasion, food, the other for soiled linen and spittoon flasks, &c., while in the centre of the building is a passenger lift which is to be used mainly for the patients of the more affluent class.

Lighting is by means of electricity generated in the engine house, light being furnished to the balconies as well as to the bedrooms. In these latter are two lights, one over the bed and the other over the looking glass, each light being governed from either switch.

Warming of the bedrooms and corridors is by means of hot-water radiators, there being in each room one such radiator opposite the end of the bed. In the recreation rooms, private sitting rooms, &c., open fireplaces have been adopted on account of their cheerfulness and their utility as regards ventilation. The chapel and dining hall are warmed by means of steam pipes carried in channels beneath the stone floors.

Ventilation is provided for in the bedrooms by windows, the upper portions of which consist of fall-to hoppers, and the middle of French casements. The lowest portion of the windows consists of low wooden doors opening from the middle.

These windows are also furnished on the outside with covered shutters which when closed serve (the windows being open) to

exclude rain and sun while at the same time affording an inlet for fresh air.

There is also a window over the door of each room so that by opening this and the front window a through current of air can be procured.

Considerable attention has been devoted to the subject of furnishing the sanatorium, special regard having been paid to securing furniture as free from dust collecting surfaces as practicable. With this end in view, furniture with rounded "corners" has been provided, the wardrobes, &c., having been constructed with rounded tops so as to facilitate cleaning and to prevent the collection of dust.

The receptacle for soiled linen has been so constructed that the bag receiving the linen can be removed from the framework supporting it, and thus the whole contents removed along with the bag for washing purposes, another bag being in the meantime replaced in the frame.

Throughout the whole of the building due attention has been paid to the importance of securing impermeable, non-absorbent and easily washable surfaces, these objects being attained by different materials in the several parts of the institution. Thus the floors of the wards and bedrooms are either of teak blocks or of boarding, and the walls are covered with washable paper.

The sewage of the institution is led direct to the Midhurst sewers, so that no difficulty with regard to sewage purification on the site itself has arisen.

The chapel which was presented to the King by Sir John Brickwood, of Portsmouth, is a very distinct feature of the institution.

The idea of an open-air chapel is due to a suggestion made by Dr. Theodore Williams and other members of the advisory committee, and it has been carried out from plans of Mr. Adams, the architect to the sanatorium. The building consists of two chapels or, rather, naves arranged in the form of an inverted V, the apex of the V pointing northward, each nave being closed on its northern or outer aspect and opened on its southern or inner aspect, there being on the southern aspect of each nave a row of cloisters which present a unique and somewhat monastic appearance (*see plate annexed*).

The chancel, which is octagonal in shape and domed, occupies the angle of the inverted V, and on the outside of the chapel, *i.e.*, to the south of the chancel is a second pulpit situated quite in the open air and which can be used in suitable weather, the patients sitting either in the cloisters or in the open space in front. The floors of the chapel which are of stone are, as has been stated, warmed underneath by steam pipes.

The following consulting and executive staff has been appointed by His Majesty the King.



(To face page 482.)



(To follow plate facing page 482.)

THE CHAPEL.

CONSULTING STAFF.

Sir William Broadbent, Bart., K.C.V.O., F.R.S.
 Sir Richard Douglas Powell, Bart., K.C.V.O.
 Sir Felix Semon, K.C.V.O.
 Sir Hermann Weber, M.D.
 Sir Lauder Brunton, M.D., F.R.S.
 C. Theodore Williams, Esq., M.V.O., M.D.
 Sir Clifford Allbutt, K.C.B., M.D., F.R.S.
 Professor Osler, M.D., F.R.S.
 James Frederick Goodhart, Esq., M.D.
 J. Kingston Fowler, Esq., M.D.
 Percy Kidd, Esq., M.D.
 William Bulloch, Esq., M.D.

EXECUTIVE COMMITTEE.

The Viscount Esher, G.C.V.O., K.C.B. (Chairman).
 Sir Frederick Treves, Bart., G.C.V.O., C.B. (Deputy
 Chairman).
 The Hon. Sidney Peel.
 Sir Francis Laking, Bart., G.C.V.O.
 Colonel Lascelles, M.V.O.
 William James, Esq., M.V.O., D.L., J.P.
 Rowland W. Bailey, Esq., M.V.O., I.S.O.
 P. Horton-Smith-Hartley, Esq., M.V.O., M.D. (Hon. Sec.).

LADY VISITORS.

Mrs. William James.
 The Lady Gifford.

The routine administration of the institution devolves upon Dr. Noel Bardswell, the medical director, who has devised an elaborate scheme of employment for the patients. The work consists in the main of gardening in some form or another, the care of poultry, or an instruction in an open-air carpenters shop. The medical director is assisted by the three resident medical officers and the necessary lay officers.

In connection with this sanatorium I have to express my indebtedness to Dr. Theodore Williams, M.V.O., a member of the advisory committee, and to Mr. Adams, the architect, both of whom were kind enough to show me over the sanatorium and to afford me information relative thereto. I am also indebted to Dr. Bardswell for kindly revising my account of the institution.

PROVISION MADE BY THE METROPOLITAN ASYLUMS BOARD
FOR THE TREATMENT OF TUBERCULOUS CHILDREN.

As a result of the appointment by the Local Government Board of a Poor Law Schools Committee in 1896 to—

Inquire into the existing systems for the maintenance and education of children under the charge of managers of district schools and boards of guardians in the Metropolis,

it was recommended *inter alia* by one of the four minority reports—

That for certain purposes a central body is necessary, and that, whether an existing body be entrusted with the work, or a new body elected, it should be representative of the guardians. This body should be charged with the provision and management of one or more institutions :—

- (a) For the care and education of children suffering from eye, skin and scalp diseases.
- (b) For the technical training of boys (the needs of girls being probably met by the recommendations contained on page 54 of the Report of the Poor Law Schools Committee).
- (c) For children requiring seaside air or other convalescent aid ; and
- (d) For children who, by reason of defective intellect or physical infirmity, cannot properly be trained in association with children in ordinary schools, and without special training would be unable to take their place in the world.

To this body should also be committed the arrangement for and supervision of "boarded-out" children, including their inspection in the country homes.

The duties above referred to were subsequently (in April, 1897) imposed upon the Metropolitan Asylums Board who had already signified their willingness to undertake the task.

In order to provide the additional accommodation for convalescent children it was resolved to purchase for £850 a site at Rustington, distant some $1\frac{1}{2}$ miles eastwards of Littlehampton station, and to erect thereon provision for a further number of children. These homes are now known as "Millfield."

I am indebted for the above information to a set of reports of the Children Committee with which Mr. G. A. Powell, Clerk to that Committee, was good enough to furnish me. He also assisted me in other directions.

MILLFIELD.

(Opened April 6th, 1904.)

Although plans for the erection of these homes were prepared in 1899, it was not found practicable to commence building operations until 1901.

The Homes were opened in the spring of 1904, it having been decided to devote the whole of the accommodation (100 beds) solely to early cases of pulmonary tuberculosis in children.



THE MILLFIELD HOMES.

(To face page 484.)

It was suggested, however, after some experience, that certain structural modifications and additions would be desirable in order that the fullest use might be made of the Homes for the open-air treatment of this malady, and as such modifications would involve increased expenditure, the late Sir William Broadbent, Bart., was asked to express his opinion as to the suitability of the situation for the treatment of this disease and as to the modifications of the establishment which were desirable.

Sir William Broadbent reported favourably upon the situation, and thought that with certain minor structural alterations the Homes could be rendered thoroughly suitable for open-air treatment of pulmonary tuberculosis in children. The buildings, as now existing, embody the result of these modifications.

The Homes, which are quite near to and which face the sea, are situated in $5\frac{1}{2}$ acres of land. They comprise four red-brick, red-tiled, partly rough-cast, entirely detached cottages or blocks, each so arranged as to afford accommodation for 25 children. One of the blocks contains, in addition, in the form of a projection northwards, the Matron's quarters and a small laundry. The two eastern blocks have, at Sir William Broadbent's suggestion, been connected by a glass-roofed "sun-room," 52 feet long by 25 feet wide, and entered at either end from the verandah 8 feet wide. This verandah, which extends in front of each of the two blocks now in question, has been constructed to afford open-air accommodation for beds wheeled out from the adjoining dormitories. The front, *i.e.*, the south of this sun-room, is intended to remain for the most part open, but revolving shutters have been fitted which can, if necessary, be closed during weather of exceptional severity. On the north side of the "sun-room" are windows introduced with the view of affording through ventilation. On the first storey of each of these two blocks united by the "sun-room" is a spacious balcony providing accommodation for patients sleeping in the open air. The general arrangement is well shown in the accompanying plate, which it should be borne in mind shows only two of the four blocks. The total cost of the alterations amounted to £2,279.

The Homes are supplied with water from a well on the site and sewage disposal is by means of a septic tank and bacteria filters.

A Resident Matron is in charge of the Homes, and Dr. Last, who lives in Littlehampton, is Medical Officer. The education of the children is duly provided for, and facilities for bathing are afforded in suitable cases.

On admission to the institution the children are classified according to the severity of their disease and there is a regular re-classification of the cases at intervals.

It is found that, generally speaking, there is a progressive advance from the inferior to superior classes and, in 1905, there was but one instance of retrogression of malady.

The general supervision of the Home is under a sub-committee of the Children Committee of the Asylums Board.

The following figures as regards cost per head, &c., during 1905 may be helpful :—

—	A. Average daily number of inmates.	B. Percentage of average daily number to normal accommoda- tion.	C. Permanent officers (all grades), highest number.	D. Maintenance and clothing per inmate per day.	E. Total cost per inmate per day including all charges.
Half-year ended Lady-day, 1905.	53	53	27	<i>d.</i> 10·57	<i>s. d.</i> 3 1½
Half-year ended Michaelmas, 1905.	72	72	27	11·20	2 8½

N.B.—The figures in column E do not include rent or loan charges, special expenditure, and head office or central expenses.

Results.

In the first annual report (for 1904) Dr. C. E. Last, the Medical Superintendent, states :—

The cases which have reached us are most instructive and illustrate the fact that children in the early stages of consumption, if placed among suitable surroundings, have great recuperative powers, a complete restoration to health being confidently expected in a very large number.

In his Annual Report for 1905 it is stated that during that year there were 63 admissions, 1 death, and 51 discharges. Of the cases discharged—

25 were cured.

5 were removed by request.

8 were transferred to the Downos School.

1 was transferred to Margate with tuberculous hip disease.

5 were unsuitable.

7 were returned as over age.

By the term "cured" is understood the circumstance that the cases on admission showed signs of pulmonary tuberculosis while for some time prior to discharge they showed no evidence of disease. Dr. Last is, however, evidently alive to the ambiguous nature of the word "cured."

See also account of "East Cliff Home," Margate, on page 404.

THE WEST WALES SANATORIUM.

(To be opened shortly.)

This institution, which I have not yet visited, was inaugurated by H.R.H. Princess Christian on April 26th, 1905. It is intended eventually to provide accommodation for 28 consumptive patients from the three counties of Pembrokeshire, Carmarthenshire, and Cardiganshire, under a scheme initiated and carried through by the West Wales Branch of the National Association for the Prevention of Consumption. I am indebted to Dr. Douglas Reid, the senior Honorary Secretary of that branch and a moving spirit in the promotion of the undertaking, for furnishing me with much valuable information relative to the scheme, as also to accounts of the institution by Dr. L. M. Bowen-Jones, Joint Honorary Secretary.

The site, which is in Carmarthenshire, consists of 13½ acres of well-wooded land on the southern slopes of Allt-y-Mynydd (The-wood-on-the-mountain), and is situated at an elevation of some 850 feet above Ordnance Datum. It is distant six miles from Lampeter and three from the Llanybyther station of the Manchester and Milford Railway. As will be seen by reference to a map, this position, relative to the three counties which the institution is to serve, is centrally situated and accessible.

The site has a south-west aspect, is surrounded by a stone wall five feet high, and is well sheltered by the surrounding slopes from the north and east winds, while the woods themselves afford opportunities for the provision of zigzag walks with shelters and rest places at intervals.

The soil of the site is regarded as an eminently suitable one—very little earth overlying loose rubble, and this again over rock with the strata so formed that the rain falling the night before can be seen in the quarry the next day at such a depth as to prove the rapidity with which the ground will dry after a shower. Where there are no trees the surface is covered with turf. Arrangements have been made whereby the area of the site can be extended either to the east or to the west if necessary; but as permission has been granted for the patients to ramble over the adjacent mountain sides such extension is not likely to be called for.

An abundant supply of water is procured from springs within some 300 yards of the site, and pumped up by means of an hydraulic ram to a service reservoir. Professor Kenwood, of University College, London, has pronounced favourably on the quality of this water. The sewage is disposed of on the septic tank system.

It was originally intended to erect a building of wood and iron, but the arguments in favour of a permanent structure were so convincing that the Committee decided to utilise the local stone

from the site. The building is rough-cast outside, the roof being of red tiles.

Behind the main building, which comprises the bedrooms and other patients' rooms, as also accommodation for the Matron and Doctor, is a separate building containing the kitchen and dining-rooms.

The passages, hall, and lavatory annexes are floored with "Terrazzo" paving on concrete, while for the bedrooms, &c., "Linotus flooring" laid on wood is used.

The interior of the walls is finished with "Adamant" plaster, and all angles are rounded off.

Warming is by means of hot water, there being one or more radiators in each room.

Lighting is by electric light generated by an oil engine and dynamos in the laundry block.

Venetian shutters, painted green, are fixed outside each bedroom window so as to enable the windows themselves to be opened in very wet and stormy weather.

As a rule each patient is provided with a separate bedroom, but two of the rooms contain two beds each.

Ventilation is provided for in each room by a window 10 feet by 5 feet, and opening from floor to ceiling; there being, in addition, the usual window above each door to promote a through current.

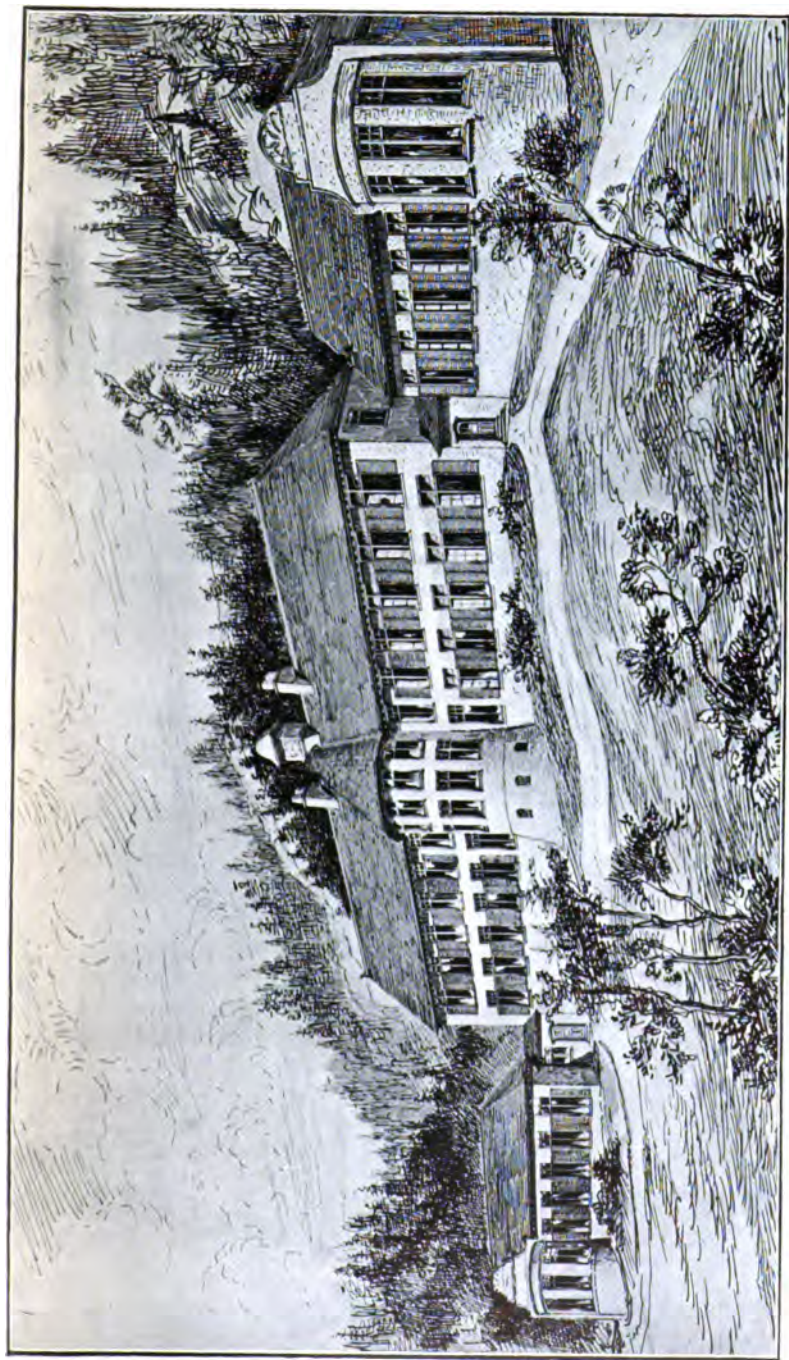
The capacity of each bedroom is at least 1,500 cubic feet.

The design of the institution is shown in the accompanying plate, there being a central two-storied building comprising an administrative portion in the centre and in each wing accommodation for 10 patients of the poorer classes. There will thus be accommodation for 20 patients in the main building. Stables, laundry, &c., are arranged for in the rear of the Sanatorium proper.

With respect to the accommodation for the eight paying patients whose contributions are expected to materially assist the funds of the institution, it is proposed to provide a detached portion for four beds at each side of the main building, as shown in the plate. Owing, however, to financial considerations the central block alone has as yet been erected. The administrative accommodation is, however, sufficient to meet the requirements of the additional beds when the other wards can be erected.

Financial Considerations.

The site has been leased to the Committee for 999 years at a nominal rent of £11 4s. by Colonel and Mrs. Davies Evans, so that no capital expenditure will be involved in this direction, and beyond the small amount mentioned no annual payment incurred.



THE WEST WALES SANATORIUM.
(The central portion alone is as yet erected.)

(To face page 488.)

The erection of the central portion of the Sanatorium, exclusive of the value of the site, has cost about £8,000, *i.e.*, the cost per head for 20 beds amounts to some £400. Towards this total nearly £8,000 has been got together by donations from the wealthier and the working classes, the support which the scheme has received from the latter class being, Dr. Reid tells me, almost phenomenal. It is probably this fact, together with the assistance which the project has received from all classes, which influenced the action of the Carmarthenshire and Cardiganshire County Councils in considering the question of making donations to the building fund of £500 and £250 respectively and annual contributions of £130 and £65; the Carmarthenshire County Council undertaking to support two beds annually, and the Cardiganshire County Council one bed. No decision has as yet been reached.

The annual upkeep of the institution and the maintenance of patients is estimated by the Committee at £1,500, and the following list has been furnished to me by Dr. Reid as some indication of the sources from which it is contemplated that this annual income may be ultimately forthcoming:—

Beds	District or Authority.	Annual Contribution.
		£
Possible 2	Carmarthenshire County Council	130
Voted 1	Cardiganshire County Council ...	65
2	Royal Dockyard, Pembroke ...	150 (Money already in hand for first year.)
2	Llanelly	130
1	Burry Port and Pembrey	65
1	Carmarthen Town	65
1	Aberystwyth and District	65
1	Haverfordwest and District	100 in hand.
1	Llandilo and District	65
1	Tenby and District	70 in hand.
1	Cardigan and District	65
1	Llandovery and District	65
1	Lampeter and District	65
	General Contributions from various sources, say,	100

This leaves vacant two non-maintained beds for persons who can pay a small sum weekly, say 10s. It is anticipated that the profit on the paying patients would more than make up any deficiency.

It may be added that local authorities in the counties concerned are considering the question of endowing beds at a capital contribution of £250, and at an annual payment of £65; and in so far as local interest is concerned it may be noted that the ladies of Llanelly have by a donation of £500 entitled themselves to two beds if the annual payment is forthcoming, that

the workmen of Pembroke Dock have provided the upkeep of two beds which will probably be continued, and that Burry Port and Pembrey have together agreed to support one bed.

NOTE.—It may be of interest to point out that the two beds for which Carmarthenshire County Council are asked to contribute would involve a rate of $\frac{1}{4}d.$ for every £3 of rateable value, that is to say, if a cottage is rated at £6 the occupier would pay $\frac{1}{4}d.$, and so on. This calculation is based upon the assumption that the County Council borrow the £500 and spread the repayment over 10 years, adding the annual repayment to the annual contribution of £130 per annum for the support of two beds.

THE WESTMORLAND SANATORIUM.

(Opened in March 1900.)

This institution, which is situated at an elevation of 110 feet in a picturesque position overlooking Morecambe Bay, is a stone structure erected on the limestone rock formation. It is $2\frac{1}{2}$ miles from Grange-over-Sands and 11 miles from Kendal, and the site at present comprises about 4 acres of land. As a Sanatorium it owes its initiation largely to the energy of Dr. Rushton Parker, the Honorary Secretary, and Dr. Paget-Tomlinson, the Treasurer, both of whom very kindly met me at the Sanatorium at the date of my second visit and gave me every assistance in their power.

The main building was originally erected as a convalescent home, but it was subsequently leased to the governing body at a rental of £70 per annum. By means of a capital expenditure of £1,200 it was converted into a Sanatorium for 16 consumptive patients, supplied with the necessary staff, and certain additions made to it, comprising many chalets, a dining room and an annexe for nurses. Since the foundation of the institution an addition of 28 beds has been made; the present accommodation (1906) comprising provision in all for 44 patients. Of these 44 beds no fewer than 16 have been acquired by district councils, boards of guardians, and associations in Westmorland at a rate of £60 per bed per annum. To these beds any resident in the district or union can be nominated, the weekly charge to other residents in the county being 25s. In addition to these beds Bolton Corporation has taken four and Bolton Guardians two, there being also several beds secured by "district" contributions from outside Westmorland.

The cubic space per patient in the wards is rather over 900 cubic feet and that in the shelters rather under 500 cubic feet. In these latter, however, the beds are practically in the open air.

Water supply is from the Grange mains; lighting by oil lamps, and sewage disposal by means of a cesspool remote from the Sanatorium.



THE WESTMORLAND SANATORIUM.

(To face page 490.)

The average cost per patient (including all expenses of maintenance, staff, &c.) was, during 1905, 26s. weekly, as compared with 30s. in the previous year. With a view of aiding the deficit occasioned by the customary charge of only £60 per bed, patients are admitted from outside the county at a charge of 2 guineas per week when the beds are not required for county cases.

The following table, which is taken from the seventh annual report, furnishes details as to the income and expenditure during each year, and it will be observed that the average cost of patients per week has been steadily diminishing.

A Financial Retrospect, 1900-1906.

Year.	Beds provided.	Average patients in residence.	Cost of each patient per week.	Income from Westmorland.	Income from out-county patients at £3 2s. per week.	Income from out-counties engaging beds at fixed rates per annum.	Expenditure on Maintenance.	Expenditure on Improvements and Extensions.	Balance at end of year. + or -.
1900, from March 17.	22	10	60	£ 1,382	£ Nil	£ Nil	£ 1,264	£ 180	- £ 64
1901 ..	22	17	40	1,700	Nil	Nil	1,718	71	- 150
1902 ..	24	20	36	1,906 (Hospital Saturday Fund about £200.)	247	Nil	1,860	408	- 250
1903 ..	24	20	36	1,851 (Hospital Saturday Fund about £200.)	452	Nil	1,849	162	+ 38
1904 ..	28	23	30	1,464	742	50 North Lonsdale.	1,833	62	+ 400
1905 ..	32	26	30	1,39 (Including £100 legacy.)	630	150 North Lonsdale.	2,004	542	+ 24
1906 ..	41	31	26	1,096	670	858 (6 districts engaging 19 beds.)	2,113	400 £250 owing for extensions in progress.	+ 153

Results.

The results of the first four years' working are summed up in the fourth annual report on the work of the Sanatorium, and seeing that the experiences of this institution are of considerable interest they are here reproduced in full.

1. "Consumption is arrested in its early stage with comparative ease and for many subsequent years; in the advanced stage as a general rule little or no permanent benefit is obtained. Hence, we now retain the milder cases for longer, the severe cases for shorter periods than formerly."

(a) "Forty-one cases have been admitted in the early stage; they have remained in the sanatorium on the average between three and four months; very nearly all are now in robust health and earning a comfortable livelihood or looking after their household affairs. Not one has died."

(b) "Fifty-four cases have been admitted in the intermediate stage; they have remained on the average between four and five months; while the great majority are earning a living and quite well a few are in indifferent health, and seven have died. Some cases apparently mild go down hill in a most disappointing way; there are grounds for believing that this is due to

simultaneous infection by various kinds of germs in addition to tubercle bacilli."

(c) Seventy-four cases have been admitted in the advanced stage; they have remained on the average between five and six months; thirty-two have died, usually within a year or so of their discharge, and most of the rest are more or less invalided.

(d) Thirty-nine cases were suffering from serious complications or were soon discharged as quite hopeless. These need not be reckoned, as no benefit could be expected."

In the fifth annual report, after a statement to the effect that owing to the difficulty of following up patients sent in from a distance detailed notice is taken only of those from the immediate neighbourhood, *i.e.*, 224 in all, the following summary is furnished relative to such cases:—

"Nineteen were so handicapped by heart disease, asthma, alcoholic liver and kidney or other non-tubercular complication as to be beyond profitable consideration.

Twenty-one were in so hopelessly advanced stages of consumption that every one died soon after coming under observation, mostly within a few weeks, or even days.

Sixty-seven were in so advanced a stage of consumption as to be not far from hopeless, and were perseveringly treated without much expectation of their ultimate recovery. No less than 43 have already died, and most of the remainder are in a critical or frail condition. Out of 46 of these admitted up to two years ago, only nine still survive.

Sixty-two were in the mature stage of consumption in which the efficacy of Sanatorium treatment is best tested, the disease being manifestly present and yet not so advanced or gravely complicated as to be beyond reasonable prospect of recovery. They remained in the Sanatorium on the average five months. Ten have died; five are invalids whose days are probably numbered; four are not thriving; over a dozen are fairly well; and over a score are quite well or even in robust health.

Fifty-five were in the nascent stage of consumption, in which bacilli cannot be detected in the spit, except by diligent and frequently repeated search, and not always then. For test purposes they are not altogether satisfactory, because we have no means of convincing the sceptical that they really had consumption. But it is much better to give them the benefit of the doubt than run the risk of allowing the disease to advance into the much less amenable stage. Indeed, it is well to suspect consumption in every case of blood-spitting (*hæmoptysis*), in every case of pleurisy, in every case of persistent loss of appetite and weight and strength, in every case of obstinate indigestion and vomiting not otherwise explicable, and in every case of bloodlessness that resists ordinary treatment. The disease is much more likely to be arrested at a Sanatorium under the influence of unlimited fresh air in all weathers and seasons, of liberal feeding with choice food, of carefully regulated rest and exercise, of daily cold sponging, of scrupulous cleanliness and disinfection, of freedom from worry, and of careful medical and nursing supervision. On the other hand, the disease is much more likely to advance at home under the influence of the ordinary indoor life, which not only lowers the vitality of the body, thereby making it more susceptible to the attacks of germs, but also provides the very breeding-ground in which germs can best flourish; in fact, the average house is the very granary of consumption. These cases remained in the Sanatorium on the average four months. They are all now, almost without exception, strong and well, and able to do their full share of work. Not one has died; and the only solitary one that is doing badly left the Sanatorium against the strongest advice, and has since then been careless in following up the treatment.

Thus, says the report, many advanced consumptives have been screened from a susceptible public for considerable periods, and have been taught to avoid spreading infection after their discharge; many less advanced

cases instead of becoming dangerously infectious have been wholly or largely freed from infectivity before returning to ordinary life; many milder cases have been restored to the ranks of wage-earners for several consecutive years, and many advocates have been sent forth to plead the cause of the open window."

The following tables relative to cases of the several sorts above referred to are here also reproduced. It is desirable, however, to point out that with regard to the A group of cases in which tubercle bacilli were not easily found, the report for 1903 states that—

"We sometimes hear it doubted if our early cases and half of our intermediate cases really had consumption because no bacilli had been obtained. It is well known that the examination of the spit for bacilli cannot be relied upon, because many cases of undoubted consumption are arrested before any spit and often even before any noteworthy cough appears. Moreover, it is equally well known that, where cough and spit exist, bacilli will be found in the spit of comparatively few, until the disease has made some definite advance. In fact, it is held that bacilli reach the lungs by passing not down the wind-pipe and air tubes, but through the throat and down the glands of the neck, in which case bacilli could not possibly be coughed up until they had made their way from the outside of the air cells through their walls, into the interior, when the consequent irritation sets up coughing and spitting, and then the germs entangled in mucus can be discovered by the microscope. If during the last four years no early cases of consumption in Westmorland have come to us, either there must have been none in the county or we have had the extraordinary misfortune to miss them all."

This abstract from the 1903 report should be read in conjunction with the comments given above from the fifth annual report. Indeed, I have given these abstracts in full because I am aware that the criticisms to which they relate have been freely made.

Westmorland Sanatorium.

Summary of after-results for years 1900-1905 inclusive, exclusive of cases which remained in the Sanatorium for less than a month or cases handicapped by any serious non-tubercular complication. The only cases here dealt with are those admitted from Westmorland and North Lonsdale.

—	Years.	Totals.	Condition on December 31st, 1906.					
			Quite well.	Well or Fairly well.	Relapsing, Failing, Feeble or Morbid.	Re-admitted.	?	Dead.
<i>All cases grouped together.</i>	1900...	88	11	2	2	—	—	18
	1901...	42	17	8	1	—	—	21
	1902...	40	19	8	2	—	1	15
	1903...	28	14	2	3	—	—	9
	1904...	38	24	2	2	—	—	10
	1905...	86	12	7	10	—	1	6
Totals ..	...	217	97 44·7%	19	20	—	2	79

Differentiation as regards after-results between "Slight," "Moderate," and "Advanced" cases.

—	Years.	Totals (including 30 re- admissions).	Condition on December 31st, 1906.					
			Quite well	Well or fairly well.	Relapsing, Falling, Feeble or Morbid.	Re- admitted.	?	Dead.
(a) "Slight"	1900...	4	4	—	—	—	—	—
	1901...	10	10	—	—	—	—	—
	1902...	14	12	1	1	—	—	—
	1903...	11	10	—	1	—	—	—
	1904...	18	12	1	—	—	—	—
	1905...	4	8	1	—	—	—	—
	Totals ...	...	56 91.1%	8	2	—	—	—
(b) "Moderate"	1900...	12	6	1	2	—	—	3
	1901...	14	6	3	—	—	—	5
	1902...	16	6	1	1	—	1	7
	1903...	6	3	2	—	—	—	1
	1904...	18	10	1	1	—	—	1
	1905...	16	7	3	5	—	1	—
	Totals ...	...	77 49.4%	11	9	—	2	17
(c) "Advanced"	1900...	17	1	1	—	—	—	15
	1901...	18	1	—	1	—	—	16
	1902...	10	1	1	—	—	—	8
	1903...	11	1?	—	2	—	—	8
	1904...	12	2	—	1	—	—	9
	1905...	16	2	3	5	—	—	6
	Totals ...	...	84 9.5%	5	9	—	—	62

(a) Tubercle bacilli found in only one case: frequently there was no expectoration.

(b) Tubercle bacilli found in 48 instances.

(c) Tubercle bacilli found in all but five cases.

N.B.—A Key to all the cases is printed separately for the use of District Representatives, Medical Men, &c. In each class the cases are marked off into four distinct years. Those marked (*) have been admitted more than once. Where tubercle bacilli are "not found," they have not always been diligently sought.

A.—CONSUMPTION SLIGHT.

Consolidation barely detectable ; tubercle bacilli not easily found ; no high fever.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
1 M	8-2	7	Not found	2 months ...	1900. Both lungs alight ... One lung alight ... Both lungs alight ... One lung alight ...	78	Farm work six and a half years ; quite well.
*2 F	15-2	16½	No spit ...	Few months		72	Teacher six years ; quite well.
3 M	28-5	22½	Not found	Few months		72	Railway shunter six years ; quite well.
*4 M	17-2	7½	No spit ...	15 months ...		65	Joiner in Leeds five years ; quite well.
5 M	4-6	10	No spit ...	6 months ...	1901. One lung alight ... One lung distinct... Pleurisy (? tubercular) ... No undoubted signs ... One lung alight ... One lung alight ... One lung alight ... One lung alight ... One lung alight ... One lung alight ...	68	Mill work five and a half years ; quite well.
6 M	20-5	14½	Not found	6 months ...		63	Groom five years ; quite well.
7 F	10-2	12	Not found	6 months ...		63	Housewife five years ; quite well.
8 F	7-4	8	No spit ...	9 months ...		63	Housewife five years ; quite well.
*9 M	17-1	17½	Not found	1 year		58	Joiner nearly five years ; quite well.
10 F	9-5	8½	Not found	18 months ...		60	Housewife five years ; quite well.
11 M	8	14½	No spit ...	2 weeks		61	Stable lad, four years ; quite well.
*12 M	21-4	10½	No spit ...	1 month		56	Farm labourer four and a half years ; quite well.
13 F	12-2	11	Not found	4 months ...		58	Ward maid nearly five years ; quite well.
14 M	12	35½	No spit ...	1 month ...		57	In post office four and a half years ; quite well.

A.—CONSUMPTION SLIGHT—continued.
Consolidation barely detectable; tubercle bacilli not easily found; no high fever.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
15 F	8.3	8½	Not found	2 months ...	1902. One lung slight ...	58	Housework one year; fairly well.
16 M	11	2½	Not found	1 month ...	One lung slight ...	57	At school in Carlisle; quite well.
17 M	7	16½	No spit ...	1 week ...	Two lungs slight ...	57	Labourer; fairly well.
18 M	8	13	No spit ...	1 month ...	One lung slight ...	57	Mill work; quite well.
19 M	15.5	14½	No spit ...	2 months ...	One lung slight ...	54	Enlisted; quite well.
*20 M	24.2	20½	No spit ...	2 years ...	One lung slight ...	29	At school; quite well.
21 M	18.5	10½	No spit ...	1 year ...	One lung slight ...	53	Gardener; in splendid health.
22 F	9.4	15	Not found	3 months ...	One lung slight ...	55	Dressmaker; in splendid health.
23 M	8	15½	Not found	2 weeks ...	One lung slight ...	55	Policeman; in splendid health.
24 F	15.2	8½	No spit ...	1 month ...	One lung slight ...	49	At home; not strong.
*25 F	64.4	80½	No spit ...	1 month ...	Two lungs slight ...	30	Light housework; well.
26 M	7.2	19½	No spit ...	6 months ...	One lung slight; pleurisy	49	Left against advice; relapsing.
27 F	26.1	14½	No spit ...	1 month ...	One lung slight ...	44	At school; fairly well.
28 F	51.3	16½	No spit ...	1 month ...	One lung slight ...	8	At school; quite well.
29 F	34.4	19½	No spit ...	1 month ...	1903. One lung slight ...	39	Cook, three years; quite well.
30 M	32.5	10½	No spit ...	3 months ...	Both lungs slight...	6	At school; quite well.

31 F	18-2	26½	Not found	6 months ...	One lung slight ...	...	42	Cigarette maker three and a half years; quite well.
32 M	7-5	25½	Not found	2 months ...	One lung slight ...	...	44	At gunpowder works three and a half years; quite well.
33 M	8-6	14½	Not found	2 months ...	One lung slight ...	...	44	Labourer three and a half years; quite well.
34 M	22-2	1	Not found	8 months ...	One lung slight ...	...	40	Blacksmith three years; quite well.
35 M	14-4	11	No spit ...	8 months ...	One lung slight ...	...	41	Farm work three years; quite well.
36 F	56-2	14½	Not found	6 weeks ...	One lung slight ...	...	10	Relapsing.
37 M	9-5	22½	No spit ...	6 months ...	One lung slight and pleurisy ...	...	38	Labourer three years; quite well.
38 F	9-4	11½	Not found	5 years ...	One lung slight ...	...	38	Married one year; quite well.
39 M	17-1	20½	No spit ...	5 weeks ...	One lung and pleurisy ...	...	34	Labourer nearly three years; quite well.
1904.								
40 F	31-1	8	No spit ...	9 months ...	One lung slight ...	...	27	At school; quite well.
41 M	31-3	14	No spit ...	1 month ...	One lung slight ...	...	26	At school; quite well.
42 F	17-4	11½	Not found	9 months ...	Two lungs slight...	...	29	Housework two years; quite well.
43 M	14-1	11½	Not found	4 months ...	Two lungs slight...	...	26	Bootmaker; quite well.
44	21-1	2½	No spit ...	2 months ...	One lung slight ...	...	26	Housework two years; quite well.
45 F	10	8	Not found	6 weeks ...	One lung slight ...	...	26	Factory work two years; quite well.
46 M	12-2	6½	Not found	2 months ...	One lung slight ...	...	25	At school; quite well.
47 M	26-6	6½	Not found	1 month ...	One lung slight ...	...	22	School boy; quite well.
48 M	30-0	18	Found ...	10 months ...	One lung slight ...	...	20	Van driving; quite well.
49 F	26-2	22	No spit ...	4 months ...	One lung slight ...	...	22	Housewife nearly two years; quite well.
50 M	24-5	28½	Not found	1 year ...	One lung slight ...	...	21	Gardener one and half years; quite well.
51 F	16-0	16½	No spit ...	4 months ...	One lung slight ...	...	21	Farm girl; quite well.
52 F	20-5	51½	No spit ...	4 months ...	One lung slight ...	...	20	Housework; quite well.

A.—CONSUMPTION SLIGHT—continued.

Consolidation barely detectable; tubercle bacilli not easily found; no high fever.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
					1906.		
53 M	58.0	11	Not found	2 months ...	Two lungs slight...	9	School boy; quite well.
54 M	29.4	19½	No spit ...	3 months ..	Two lungs slight...	12	Commercial traveller; well.
55 F	29.8	16½	No spit ...	2 years ...	Two lungs slight...	12	Domestic servant; quite well.
56 F	14.1	19	No spit ...	6 weeks ...	Two lungs slight...	15	Housework; quite well.
					1906.		
57 F	16.0	3½	No spit ...	5½ months ...	Two lungs slight...	5	School girl; quite well.
58 F	18.6	11	Not found	6 weeks ...	Two lungs slight...	5	Housemaid; relapsing.
59 F	14.5	14½	No spit ...	3 months ...	Two lungs slight...	2	Housewife; well.
60 M	15.0	23½	Not found	6 months ...	Two lungs slight..	2	—
61 M	—	—	No spit ...	6 months ...	Two lungs slight...	—	—
62 F	12.6	7½	No spit ...	8 months ...	Two lungs slight...	1	Housemaid; well.
63 F	—	—	No spit ...	3 months ...	Slight consolidation	—	—
64	—	—	No spit ...	2 months ...	Slight consolidation	—	—
66 M	—	—	Not found	1 year ...	Slight consolidation	—	—

B.- CONSUMPTION MODERATE.

Consolidation of one or both lungs not extensive; no cavity; no high fever; tubercle bacilli commonly found.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
1 M	10	17	No spit ...	4 years ...	1900. Consolidation slight ...	79	Porter four and a half years; quite well.
*2 F	28	16½	Not found	2 years ...	Consolidation slight ...	29	Music teacher; quite well.
3 F	55-4	27	Found ...	1½ years ...	Consolidation in one lung ...	—	Died in three and three-quarter years.
*4 F	57-1	12	Found ...	1½ years ...	Consolidation in one lung ...	11	Mill work; feeble.
5 M	31-3	7½	Found ...	6 months ...	Consolidation in one lung ...	72	Clerk six years; quite well.
*6 M	48-0	24½	Not found	11 years ...	Consolidation in one lung; hemoptysis.	8½	Light farm work; quite well.
7 M	20-6	24½	Not found	2 years ...	Consolidation in two lungs ...	74	Stable lad six years; quite well.
8 F	40-2	15½	Found ...	1½ years ...	Consolidation marked ...	69	Failing.
9 M	5-3	10½	Found ..	7 months ...	Consolidation marked in one lung.	—	Abandoned, and died in five months.
10 F	22-2	18½	Found ...	4 months ...	Consolidation in one lung ...	—	Died in ten months.
11 M	25-2	25	Not found	8 months ...	Consolidation in one lung ...	68	Farm work five and a half years; quite well.
*12 M	19-1	24½	Found ...	4 months ...	Consolidation in one lung ...	45	Settled in Virginia; quite well, three and a half years.
13 M	10-3	14	Found ...	8 months ...	1901. Consolidation in one lung ...	—	Died in three and a half years.
14 M	16-5	8½	Not found	2 months ...	Consolidation in one lung ...	66	Ticket collector for five and a half years.
15 M	36-2	12½	Found ...	14 months ...	Consolidation in one lung ...	—	Died in 12 months.
16 F	25-2	8	Found ...	1 year ...	Consolidation in one lung ...	62	Recently married; quite well.

B.—CONSUMPTION MODERATE—continued.
Consolidation of one or both lungs not extensive; no cavity; no high fever; tubercle bacilli commonly found.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
17 F	16-2	7	No spit ...	6 years ...	1901. Consolidation in two lungs ...	64	Housework five years; quite well.
18 M	12-6	5	Not found	Few months	Consolidation marked in one lung	64	At school; quite well.
19 F	14	24	Not found	6 months ...	Consolidation in one lung ...	68	Relapsing; weak.
20 M	4	4	Found ...	10 months ...	Consolidation in one lung ...	—	Died in four and a half years.
*21 M	16	18	Not found	1 year ...	Consolidation in one lung ...	60	Hawker four years; quite well.
22 F	9-5	12½	Not found	Some years...	Consolidation marked in one lung	62	School teacher five years; quite well.
23 F	4-6	6½	Not found	2 years ...	Consolidation in one lung ...	62	Housemaid; quite well.
24 M	19-2	6	Not found	7 years ...	Consolidation in one lung ...	67	Slight farming; well.
25 M	20-8	21½	Found ...	1½ years ...	Consolidation in one lung ...	—	Died in four and a half years.
26 M	6-1	7	Not found	4 months ...	Consolidation in one lung; laryngeal tubercle.	—	Died in six and a quarter years.
27 F	84	16½	Found ...	1 month ...	1902. Both lungs slight; fever ...	—	Died in fifteen months.
28 F	21-1	11½	Found ...	8 months ...	Consolidation in one lung ...	52	Nursemaid in Australia four years; quite well.
*29 F	86-2	20½	Found ...	4 months ...	Consolidation in one lung ...	19	Housework one and a half years; quite well.
30 M	18-6	15½	Found ...	8 years ...	Consolidation in one lung ...	52	Schoolmaster four years; quite well.
31 F	12-6	16	Not found	2 years ...	Consolidation in one lung ...	58	Married two or three years; feeble.
31 F	86-8	11½	No spit ...	4 months ...	Consolidation in one lung ...	—	Died in five and a half months.

33 M	7-6	5½	Found ...	6 months ...	Consolidation in one lung; hemoptysis.	—	Died in four and a quarter years.
34 F	15	4½	Not found	2 months ...	Consolidation in one lung	51	Married four years; quite well.
35 F	14-4	11½	Found ...	6 months ...	Consolidation in one lung	—	Died in three years.
36 F	15-8	19	Not found	8 years ...	Consolidation: huge glands	37	Mill work three years; well.
37 M	10	31½	Not found	1 year ...	Consolidation in one lung	—	Died in three and a third years.
38 F	12-6	16½	No spit ...	7 months ...	Consolidation in one lung	50	Farmhouse work four years; quite well.
39 M	12-4	14½	Not found	4 years ...	Consolidation in one lung;	49	Labourer in Quebec four years; quite well.
40 F	24-4	11½	Found ...	8 months ...	hemoptysis. Consolidation in one lung	—	Died in two years.
41 F	19	5	Found ...	1 year ...	Consolidation in one lung	46	Married one year; heart disease and paralysis.
42 F	4-2	—	Found ...	2 years ...	Consolidation in one lung	—	Died in fifteen months.
1903.							
43 F	34-3	12½	Found ...	4 years ...	Consolidation in one lung; lupus	—	Died in thirteen months.
44 F	19-4	37	Not found	3 years ...	Consolidation in one lung	41	Housework three and a half years; quite well.
45 M	53-2	12	Found ...	6 months ...	Consolidation in one lung	23	Labourer two years; well.
46 M	21-1	23½	No spit ...	4 months ...	Consolidation in one lung	39	Mining in South Africa three years; quite well.
47 F	28-4	8½	Not found	4 years ...	Consolidation in one lung	34	Housework nearly three years; fairly well.
48 F	32	14½	Found ...	8 months ...	Consolidation in one lung	31	Hospital nurse two and a half years; quite well.
1904.							
49 M	31-5	11½	Found ...	6 months ...	Consolidation in one lung	28	Farm labourer in Canada; quite well.
50 F	21-5	2½	Found ...	9 months ...	Consolidation in one lung	—	Died in six months.
51 M	18	23½	Found ...	1 year ...	Consolidation in one lung	31	Farmer two and a half years; quite well.
52 M	18-4	21½	Found ...	4 months ...	Consolidation in one lung	28	Chauffeur two years; quite well.

B.—CONSUMPTION MODERATE—continued.

Consolidation of one or both lungs not extensive; no cavity; no high fever; tubercle bacilli commonly found.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
					1904.		
53 F	13	11½	Found ...	1 month ...	Consolidation in one lung	28	Housemaid two years; quite well.
54 M	12	21½	Not found	6 weeks ...	Consolidation in two lungs	28	Wagon works two years; quite well.
55 F	14	20	Not found	1½ years ...	Consolidation in one lung	27	Housework; quite well.
56 F	11	4	Found ...	3 years ...	Consolidation in one lung	27	Invalid.
57 M	28-6	—	Found ...	10 months ...	Consolidation in one lung	23	Gardener two years; quite well.
58 M	11	17½	Found ...	4½ months ...	Consolidation in one lung	26	Innkeeper; quite well.
59 F	11-5	16	Found ...	2 years ...	Consolidation in one lung	25	Dreammaker two years; fairly well.
60 M	17	16	Not found	8 months ...	Consolidation in one lung	24	Clerk two years; quite well.
61 M	30	25	Found ...	6 weeks ...	Consolidation in one lung	17	Shopman; quite well.
					1906.		
62 F	12	16½	No spit ...	1 year ...	Consolidation in one lung	21	Clerk; quite well.
63 M	16	14½	Found ...	3 months ...	Consolidation in one lung	20	Housework; well.
*64 M	27-5	17½	Found ...	8 months ...	Consolidation in one lung	12	Sawyer; quite well.
65 F	20	16½	Found ...	16 months ...	Consolidation in one lung	17	School teacher; quite well.

66 M	29	16½	Found ...	2 months ...	Consolidation in one lung ...	16	Farm labourer; quite well.
67 F	40	8½	Not found	10 months ...	Consolidation in one lung ...	13	At leisure; quite well.
68 F	21-6	8½	Not found	6 months ...	Consolidation in one lung ...	16	Housewife; feeble.
69 M	23	16½	Found ...	6 months ...	Consolidation in one lung ...	16	Mill work; feeble.
70 F	13-4	4	Found ...	12 months ...	Consolidation in two lungs ...	17	Left against advice; lost sight of.
71 M	24	26½	Found ...	1½ years ...	Consolidation in one lung ...	14	Gardener; relapsing.
72 F	32-5	8½	No spit ...	6 months ...	Consolidation in one lung ...	12	Relapsing.
*73 F	51-3	11½	Found ...	2 years ...	Consolidation in two lungs ...	7	Relapsing; just re-admitted.
74 M	17-4	21½	Found ...	8 weeks ...	Consolidation in one lung ...	15	Miner; fairly well.
75 M	20	22½	Found ...	9 months ...	Consolidation in two lungs ...	13	Farm work; quite well.
76 M	29	43	No spit ...	5 months ...	Consolidation in one lung ...	9	Carter; quite well.
77 M	27-2	6½	Found ...	12 months ...	Consolidation in one lung ...	6	Gardener; quite well.
1906.							
78 M	30-2	11½	Not found	8 months ...	Consolidation in one lung ...	5	Relapsing.
79 M	23-4	1½	Not found	8 months ...	Consolidation in two lungs ...	5	Not working yet; well.
80 F	25-4	10½	No spit ...	6 months ...	Consolidation in one lung ...	4	School teacher; quite well.
81 M	23-4	13½	No spit ...	6 months ...	Consolidation in one lung ...	3	Gardener; quite well.
82 M	33	10½	No spit ...	1 month ...	Consolidation in one lung ...	1	Convalescing at seaside.
83 F	22-2	21½	No spit ...	2 months ...	Consolidation in one lung ...	2	Schoolgirl; quite well.

B.—CONSUMPTION MODERATE—continued.

Consolidation of one or both lungs not extensive; no cavity; no high fever; tubercle bacilli commonly found.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
84 F	—	—	Found ...	1 year ...	1906—cont. Consolidation in one lung ...	—	—
86 F	—	—	No spit ...	6 months ...	Consolidation in one lung ...	—	—
86 F	—	—	No spit ...	2 weeks ...	Consolidation in one lung ...	—	—
87 F	—	—	Found ...	2 years ...	Consolidation in one lung ...	1	Housemaid; quite well.
88 M	14.6	8½	Found ...	8 months ...	Consolidation in two lungs ...	—	—
89 M	—	—	No spit ...	2 years ...	Large catarrh in two lungs ...	—	—

C.—CONSUMPTION ADVANCED.

Cavity or extensive consolidation; often considerable fever; tubercle bacilli usually found abundantly.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
1 M	18.2	10½	Found ...	3 years ...	1900. Large consolidation in two lungs	—	Died in 16 months.
2 F	10	11	Found ...	6 years ...	Cavity + consolidation ...	—	Died in nine months.
3 M	28.5	80½	Found ..	4 years ...	Cavity + consolidation ...	7½	Clerk over six years; quite well.

4 M	19-4	8	Found ...	5 months ...	Large consolidation in two lungs	—	Died in seven months.
5 F	17	7	Found ...	9 months ...	Consolidation in two lungs; fever	—	Died in seven months.
6 F	48-1	8½	Found ...	6 months ...	Consolidation extensive ...	—	Died in nine months.
*7 F	54-1	26	Not found	1 year	Cavity + consolidation ...	—	Died in nineteen months.
8 F	19-2	22	Found ...	2½ months ..	Consolidation in one lung	—	Died in 12 months.
9 M	48-3	17½	Found ...	8 months ...	Consolidation in two lungs; fever	—	Died in 10 months. ¹
10 M	41-1	8	Not found	1 year	Cavity; fever; kidney affected	—	Died in 12 months.
11 F	12-5	6½	Found ...	2 years ...	Consolidation in two lungs; fever	—	Died in eight months.
*12 F	54	14	Found ...	1½ years ...	Cavity in one lung	—	Died in two and a half years.
13 F	48-4	8	Found ...	8 years ...	Large consolidation in one lung	64	Married two years; fairly well.
14 F	22-3	4½	Found ...	1 year	Consolidation in one lung; high fever.	—	Died in four months.
15 F	26	9	Found ...	1 year	Consolidation in two lungs; fever	—	Died in two months.
16 M	26	2	No spit ...	Few months	Advanced bowel consumption...	—	Died in eight months.
*17 M	20-2	4½	Found ...	4 years ...	Consolidation in one lung; bowel consumption.	—	Died in three months.
1901.							
18 M	7-1	10	Found ...	1 year	Laryngeal tubercle; high fever	—	Died in ten days.
19 M	32-2	28½	Found ...	18 years ...	Old empyema ...	64	Invalid in Cumberland.
20 F	45-3	—½	Found ...	Many years	Cavity; abscesses in neck, &c.	—	Died in six months.

N.B.—Cavity + Consolidation means cavity in one lung and consolidation in the other.
Many in Class O would as correctly be in Class B as hopeless from the outset.

C.—CONSUMPTION ADVANCED—continued.
Cavity or extensive consolidation; often considerable fever; tubercle bacilli usually found abundantly.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
21 M	8-1	3	Found ...	4 years ...	1901—cont. Cavity + consolidation: fever...	—	Died in nine months.
22 F	9-2	5½	Found ...	3 years ...	Large consolidation in one lung	—	Died in four months.
23 M	16-4	3	Found ..	8 months ...	Consolidation in two lungs; fever	—	Died in nineteen months.
*24 F	37-4	6½	Found ...	14 months ...	Cavity in one lung ...	—	Died in twenty-one months.
25 M	21-6	7	Found ...	10 months ...	Cavity in two lungs ...	—	Died in seven and a half months.
26 M	28	7	Found ...	6 months ...	Cavity + consolidation ...	—	Died in four months.
27 M	14-4	13½	Not found	?	Cavity in one lung ...	64	Seeking work; quite well.
28 F	24-8	22½	Found ...	3 years ...	Cavity in one lung ...	—	Died in three and a half years.
29 M	17-5	11	Found ...	5 years ...	Cavity + consolidation ...	—	Died in fourteen months.
30 F	5-6	—	Found ...	9 months ...	Cavity + consolidation ...	—	Died in six months.
31 F	12-1	8	Found ...	4 months ...	Cavity in one lung ...	—	Died in ten months.
*32 F	75-2	8	Found ...	1½ years ...	Cavity in one lung ...	—	Died in eight months.
33 F	14	12	Found ...	1½ years ...	Cavity in one lung ...	—	Died in seven months.
34 M	29-4	15	Found ...	3 years ...	Cavity + consolidation; fever	—	Died in seven months.
35 F	12-4	9½	?	2 years ...	Cavity in one lung ...	—	Died in ten months.

							1902.			
36 M	31-6	16½	Found	...	3 months	...	Cavity in one lung	...	—	Died in twenty one months.
37 F	42	—12	Found	...	6 weeks	...	Large consolidation in two lungs; high fever.	...	—	Died in six weeks.
38 M	21-3	4½	Found	...	1 month	...	Consolidation in one lung	...	—	Died in twenty-one months.
39 F	24	11½	Found	...	2 years	...	Cavity in one lung; fever	...	—	Died in twenty-five months.
40 F	12-5	9½	Found	...	2 years	...	Cavity in one lung; fever	...	—	Died in sixteen months.
41 M	8	6½	Found	...	7 months	...	Cavity in one lung	...	—	Died in nine months.
42 M	21-2	21½	Found	...	1 year	...	Small cavity in lung	...	—	Died in eleven months.
*43 M	30-8	18½	Found	...	2 months	...	Cavity in one lung	...	38	Shopkeeper three years; quite well.
44 F	21-3	2	Found	...	1½ years	...	Consolidation in two lungs; fever.	...	—	Died in three months.
45 M	12	13	Found	...	6 months	...	Cavity in one lung; hæmoptysis	...	23	Shopkeeper three years; well.
							1903.			
46 F	54	16½	No spit	...	1 year	...	Consolidation in two lungs; bone disease.	...	—	Died in two years.
47 M	29-1	35½	Found	...	3 years	...	Cavity in one lung	...	—	Died in three years.
*48 M	81	9½	Found	...	6 months	...	Cavity in one lung	...	—	Died in six months.
49 F	81	20½	Found	...	6 months	...	Consolidation in two lungs	...	36	Housework in Canada; (?) quite well.
50 M	34-5	24½	Found	...	6 months	...	Cavity in one lung	...	—	Died in two years.
51 F	15-1	6	Found	...	8 months	...	Cavity in one lung; fever	...	—	Died in thirteen months.
*52 M	23	2	Found	...	7 months	...	Cavity + consolidation	...	—	Died in six months.

N.B.—Cavity + Consolidation means cavity in one lung and consolidation in the other.
Many in Class C would as correctly be in Class E as hopeless from the outset.

C.—CONSUMPTION ADVANCED—continued.

Cavity or extensive consolidation; often considerable fever; tubercle bacilli usually found abundantly.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
					1903—cont.		
53 F	20-6	6½	Found	8 months	Large consolidation in two lungs	85	Housekeeper; feeble.
54 M	22	21	Found	6 months	Cavity in one lung	—	Died in eight months.
55 M	21-6	19	Found	6 months	Cavity in one lung	83	Invalid.
56 M	19-6	8½	Found	5 months	Extensive cavity in two lungs...	—	Died in 18 months.
					1904.		
57 M	25	10½	Found	18 months	Large consolidation in two lungs	—	Died in six months.
*58 F	20	16½	Found	15 months	Cavity in one lung	—	Died in nine months.
59 M	5-4	8½	Found	2 years	Cavity in two lungs	—	Died in three weeks.
60 F	10	0	Found	15 months	Consolidation in two lungs	—	Died in five months.
61 F	25-2	2½	Found	1 year	Cavity + consolidation...	—	Died in one month.
62 M	18-2	0	Found	6 weeks	Cavity; high fever	—	Hopeless. Died in five weeks.
63 F	10-2	2½	Found	8 months	Large consolidation; high fever	—	Died in three weeks.
64 F	12-2	0	Found	9 months	Cavity + consolidation; fever	—	Died in seven weeks.
65 M	21-6	18½	Found	2 years	Cavity in one lung	20	Gardener; quite well.

	18	10	Found	7 months ...	Cavity in one lung; fever ...	22	Invalid.
66 M	18	10	Found	7 months ...	Cavity in one lung; fever ...	22	Invalid.
67 M	37-8	86½	Found	6 weeks ...	Extensive consolidation; high fever.	19	Factory work one and a half years; quite well.
68 M	4-1	4½	Found	1 year ...	Extensive consolidation; fever	—	Died in three days.
1906.							
69 F	15-6	10½	Found	2 years ...	Extensive consolidation in two lungs.	20	Invalid.
70 M	48	29½	Found	2 years ...	Extensive consolidation	12	Farm work; fairly well.
71 F	52	12½	Found	4 years ...	Large consolidation; high fever	9	Invalid.
72 M	18-2	8½	Found	3 months ...	Cavity	—	Died in one and a half years.
73 M	10-2	4	Found	9 months ...	Extensive consolidation; high fever.	—	Died in five months.
74 M	18	14½	Found	4 months ...	Cavity	—	Died in one and a half years.
75	50-8	11	Found	1 year ...	Extensive consolidation in two lungs.	7	Housemaid; quite well.
76 M	51-8	15½	Found	3 months ...	Extensive consolidation...	6	Schoolboy; feeble.
77 M	29-1	28½	Found	1 year ...	Cavity	12	Draper; feeble.
78 M	41	21½	Found	2 years ...	Extensive consolidation in two lungs.	7	Plumber; quite well.
79 M	28-2	16½	Found	3 years ...	Cavity + consolidation...	—	Died in sanatorium.
80 M	36-5	6½	Found	8 months ...	Extensive consolidation	6	Invalid.
81 M	16-0	11½	Found	10 months ...	Cavity + consolidation; fever	—	Died in six weeks.
82 F	39-4	28½	Found	2 years ...	Extensive consolidation	6	Housewife; well.

N.B.—Cavity + Consolidation means cavity in one lung and consolidation in the other.
Many in Class C would as correctly be in class E as hopeless from the outset.

C.—CONSUMPTION ADVANCED—continued.

Cavity or extensive consolidation; often considerable fever; tubercle bacilli usually found abundantly.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
83 M	19-0	0	Found ...	6 months ...	Extensive consolidation; fever	—	Died in three months.
84 M	9-4	4	No spit ..	8 months ...	Extensive consolidation in two lungs.	10	Schoolboy; well.
85 M	22-0	1½	Found ...	2 months ...	1906. Cavity + consolidation; fever	5	Invalid.
86 M	27-0	4½	Found ...	7 months ...		8	Very light farm work; fairly well.
87 F	19-1	19½	Found ...	7 months ...		8	Housewife; fairly well.
88 M	10-0	11½	Found ...	1 year ...		4	Sinking.
89 F	—	—	Found ...	1½ years ...		—	—
90 M	—	—	Found ...	5 years ...	Large cavity	—	—
91 M	—	—	Found ..	8 months ..	Extensive consolidation ...	—	—
92 M	—	—	Found ...	6 months ...	Large cavity; fever ...	—	—

N.B.—Cavity + Consolidation means cavity in one lung and consolidation in the other.
Many in Class O would as correctly be in Class E as hopeless from the outset.

As has been already stated, the annual reports since 1904 do not comprise cases which remained in the institution less than a month, cases severely handicapped by serious non-tubercular complications, or cases coming from places outside Westmorland or North Lonsdale. The latter which follow were taken from the annual report for 1904, and they are here retained merely to indicate the type of cases dealt with in this group. The last column relates, of course, to the condition of the patients in 1905.

D.—CONSUMPTION SERIOUSLY COMPLICATED.

Some serious non-tubercular complication, e.g., heart disease, chronic bronchitis, &c., consumption mostly slight or absent.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
1 F	19-8	8½	Not found	15 years ...	Asthma ...	54	Housekeeper ; fairly well.
2 M	18-6	16	Found ...	6 months ...	Alcoholic fibrosis ; consumption	—	Died in a year.
*3 M	30-4	26½	Not found	2 years ...	Neurasthenia ...	43	Labourer ; weak.
*4 F	21-8	20½	Not found	6 years ...	Asthma ...	36	Housework ; weak.
5 M	6-6	7½	Not found	—	Heart disease ...	34	Paralysed by a stroke.
6 M	26-6	14½	Not found	2 years ...	Heart disease and consumption	37	Mill work ; quite well.
7 M	17-1	1½	Not found	2 months ...	Heart disease ...	—	Died of apoplexy in two months.
8 F	11-8	10½	Not found	10 years ...	Asthma and consumption ...	34	Housework ; well.
9 M	6-6	8½	Found ...	3 years ...	Heart disease and consumption	—	Died of apoplexy in fourteen months.
10 F	10	1½	Not found	10 years ...	Asthma ...	31	Housework ; well.
11 F	6-6	6	Not found	7 years ...	Asthma ...	31	Housework ; weak.

D.—CONSUMPTION SERIOUSLY COMPLICATED—continued.
Some serious non-tubercular complications, e.g., heart disease, chronic bronchitis, &c., consumption mostly slight or absent.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
12 M	8.1	18	Found ...	2 years ...	Asthma and consumption ...	—	Died in fourteen months.
13 F	0.5	15½	Not found	10 years ...	Asthma	26	Housework; asthmatic.
14 F	11	22½	Not found	4 months ...	Asthma	26	Invalid pensioner.
15 M	4	2½	Found ...	6 weeks ...	Heart disease and consumption	24	Purser; in splendid health.
16 M	12	6	Found ...	1 year ...	Asthma and consumption ...	—	Died in six weeks.
17 F	8.2	2½	Not found	6 months ...	Asthma	21	Asthmatic.
18 M	17	18	Not found	1 year ...	Heart disease	14	Light labour; well.
19 F	2.2	—	No spit ...	2 years ...	Advanced heart disease... ..	—	Died next day.

E.—REJECTED AS HOPELESS.
Consumption far too advanced for any possible benefit.

Case and Sex.	Weeks in Sanatorium.	Lbs. gained.	Bacilli.	Previous illness.	State on Admission.	Months since Discharge.	History after Discharge.
1 F	1.3	—	Not sought	?	Cavity; high fever	—	Died in two months.
2 M	2	—	Not sought	9 months ...	Cavity + consolidation	—	Died in ten days.
3 M	8.1	—	Not sought	7½ years ...	Cavity in one lung	—	Died in eight months.
4 M	1.5	—	Not sought	6 months ...	Cavity + consolidation	—	Died in six weeks.

5 M	1-1	—	Not sought	1 year ...	Cavity	—	Died in two weeks.
6 M	2-1	—	Not sought	4 years ...	Cavity in 1 lung; fever... ..	—	Died in 20 months.
7 M	0-1	—	Not sought	2½ years ...	Cavity + high fever	—	Died in two days.
8 M	0-4	—	Found ...	5 years ...	Cavity + consolidation; fever... ..	—	Died in four months.
9 F	0-6	—	Found ...	5 years ...	Cavity + consolidation	—	Died in three weeks.
10 F	1-5	—	—	6 months ...	High fever; bowel consumption	—	Died in seven weeks.
11 F	1-2	—	Found ...	1 year ...	Cavity; high fever	—	Died in four months.
12 M	2-4	—	Found ...	2 years ...	Cavity and consolidation; high fever.	—	Died in five weeks.
13 F	9-6	—	Found ...	6 months ...	Cavity; high fever	—	Died in nine days.
14 F	3-2	—	Found ...	6 months ...	Cavity in two lungs; high fever	—	Died in two months.
15 F	1	—	Found ...	1 year ...	Cavity in two lungs; high fever	—	Died in ten weeks.
16 M	3-4	—	Found ...	2 years ...	Cavity in two lungs; high fever	—	Died before discharge.
17 M	1	—	Found ...	1 year ...	Cavity in one lung; high fever	—	Died in a fortnight.
18 F	4-1	—	Found ...	3 months ...	Acute in two lungs	—	Died in a month.
19 F	5-2	—	Found ...	1 year ...	Cavity; high fever	—	Died in two months.
20 F	4-1	—	Found ...	1½ years ...	Cavity and consolidation; high fever.	—	Died before discharge.
21 M	6-4	—	Found ...	3 months ...	Acute in two lungs	—	Died before discharge.

The following Statement, which is taken from the last annual Expenditure, but also how successful this Institution Associations of charitable persons within the County,—

STATEMENT OF ACCOUNTS FOR THE

GENERAL

INCOME.

	£	s.	d.
Kendal Corporation (free bed)	60	0	0
Kendal Guardians (free bed)	60	0	0
West Ward Guardians (free bed)	60	0	0
South Westmorland Rural District Council (free bed)	60	0	0
Kendal (three free beds)	179	16	0
Windermere (two free beds)	101	16	0
Ambleside (free bed)	69	19	0
Milnthorpe, Arnsdale, and Beetham (free bed)	58	1	8
Kirkby Lonsdale (free bed)	61	9	6
Heversham and Endmoor (free bed)	62	9	10
Appleby and Kirkby Stephen (free bed)	55	8	6
West Ward (free bed)	61	8	3
Burton and Holme (free bed)	32	18	6
General Subscriptions	168	13	0
Non-County Patients at £2 2s. per week	670	3	0
North Lonsdale (two free beds); contribution for four months	150	0	0
Sale of pigs	17	0	6
Kirkcudbright (three beds) and extra cases	278	4	0
Dumfries (four beds) quarter of year	90	0	0
Boothdale (three beds) three quarters of year	180	0	0
Bolton Corporation (four beds) half-year	160	0	0
Bolton Guardians (two beds) } carried to 1907.			
Dumfries (fifth bed) }			

Total £2,640 7 9

I certify that I have examined the Books of the Westmorland Sanatorium, and the Books, and find all correct; I also certify that I have verified the Bank balance, hands of the Treasurer, on a balance of the Combined Accounts for the year ending
W. S. PAGET-TOMLINSON *Hon. Treasurer.*

report, will serve to show not only the details of Income and has been in securing the support of Local Authorities and

YEAR ENDING DECEMBER 31st, 1906.

MAINTENANCE FUND.

EXPENDITURE.

	£	s.	d.	£	s.	d.
I. Provisions—						
Meat	868	13	7			
Bread and groceries	250	14	11			
Milk, butter, and eggs	289	1	10			
Fish and poultry	61	11	6			
Vegetables and fruit	44	5	10			
Malt liquors	5	11	8			
				1,014	19	4
II. Medical—						
Medical Appliances, Drugs and disinfectants	46	7	5			
Wines and spirits	0	7	0			
				46	14	5
III. Domestic—						
Washing	98	1	7			
Coal, coke, and oil	74	19	4			
Carriage of parcels	1	10	9			
Carting and conveyances	12	9	6			
Sundries	2	16	7			
				189	17	9
IV. Establishment charges—						
Rent, taxes and insurance	96	10	0			
Water rate	44	12	0			
Repairs and renewals	73	11	8			
Man's wages; garden expenses	71	12	9			
Stable expenses	31	16	0			
Food for pigs and poultry	6	15	9			
				318	18	2
V. Salaries and Wages—						
Resident Medical Officer and <i>Locum Tenens</i>	236	9	10			
Honorarium to Chaplain	10	0	0			
Matron	63	0	6			
Nurses	76	1	6			
Servants	106	1	10			
				493	13	2
VI. Administration—						
Printing and stationery	34	4	4			
Stamps and telegrams	14	16	6			
				49	0	10
				2,113	3	8
Balance carried to Extension Fund				527	4	1
Total				£2,640	7	9

Kirkby Lonsdale, January 25th, 1907.

have compared the Vouchers for the Payments with the corresponding entries in and that the Sum of One Hundred and Fifty-three Pounds and Sevenpence is in the December 31st, 1906.

ROBERT PALMER, *Hon. Auditor.*

THE WINSLEY SANATORIUM.

(Opened December 16, 1904).

This institution has been erected by the Gloucestershire, Somersetshire and Wilts. Branch of the National Association for the Prevention of Consumption, for the treatment of early cases of pulmonary tuberculosis occurring in persons other than paupers resident in one or other of the three counties comprising the Association.

The movement, which has been well supported by the three counties concerned, is largely due to the initiation and energy of Dr. Lionel Weatherly, of Bath, who is now Chairman of the Board of Management, and one of the Trustees of the Sanatorium.

The President of the three counties branch of the National Association for the Prevention of Consumption is Sir John Dickson-Poynder, Bart., M.P. The project is receiving the support of the Corporations of Bristol, Bath, Swindon and Gloucester, as also of other public bodies and large firms.

The original estimated cost was some £22,000 as is shown by the table later on. This estimate has, however, been exceeded by some £10,000 owing to the necessity for a separate drainage scheme, additional buildings for another 10 beds, soft and rain water supply, servants block, doubling the heating arrangements, laying out of grounds, extra electric lighting, entrance gates, and fencing. Towards this sum about £20,000 has been already collected.

The total accommodation consists of 66 beds, inclusive of the chalets which have been erected by Mr. Samuel White, of Clifton. Including the latter eight beds, the cost per bed has apparently been about £485.

The site, which consists of 50 acres of wood and pasture land, is on the Great Oolite, and is situated at an elevation of about 400 feet above Ordnance Datum. It overlooks the picturesque valley of the Avon with the Wiltshire hills in the distance, and is conveniently situated for the district from which cases are drawn, being accessible both by road and rail. It is six miles south-east of Bath, and one mile from Limpley Stoke station, on the Great Western Railway. The town of Bradford-on-Avon is $2\frac{1}{2}$ miles to the east.

The Institution, which is sheltered from northerly and easterly winds, is erected in what is known as Midhill Quarry, and from part of this quarry the stone for the erection of the institution was hewn. Efforts are being made to secure further shelter from the east and north by planting belts of trees. Parts of the site are extremely picturesque, and the paths traverse sylvan scenery of great beauty. In front of the main building is an

attractively laid out garden, from which the patients can view the panorama. The site is well adapted for enabling patients to secure in one or another part of the grounds shelter from strong winds.

The Sanatorium, for the accompanying plate of which I am indebted to Dr. E. Dunbar Townroe, the late Medical Superintendent of the institution, has been erected partly upon philanthropic and partly upon co-operative lines. It is eventually to provide accommodation for perhaps 100 patients, but the buildings at present erected, all of which are of a thoroughly permanent character, consist of—

- (a) a block comprising 26 beds for patients, together with administrative accommodation for an institution containing 80 to 100 beds ;
- (b) a block for 32 beds ;
- (c) a laundry block.
- (f) A group of four wooden chalets each affording accommodation for two patients.

There was already on the estate a block of cottages which has been converted into rooms for the use of some of the staff.

(a) The main and administrative block, which faces south, consists centrally of a two-storied building, with at each end an additional story for the accommodation of the staff.

This main building is one room deep with a well-lighted and ventilated corridor to the north. It is so built as to afford to each room a maximum of light and ventilation.

At each end of this corridor is an annexe, comprising w.c.'s, lavatories and bath-room.

The ground floor comprises the following rooms :—

- A large reception room.
- Four rooms for the medical staff.
- Two rooms for the matron.
- Six bedrooms for patients.
- A cloak-room at either end.

On the first floor the arrangements are practically identical, except that in place of the rooms for the medical staff and the matron, the entire accommodation is devoted to the patients.

The rooms are lofty and well-lighted, and the windows are so arranged as to allow of easy perfilation.

The cubic capacity of each room is rather over 1,500 feet.

At the rear of the main pavilion, and communicating with it by a covered corridor is the administrative portion of this building. This comprises a lofty dining hall for the patients, a kitchen, scullery, pantry, &c., and a servants' hall.

(b) The second block, which is for 32 patients, is very similar in structure to that already described, except for the fact that it is a three-storied in place of a two-storied building, and that

each annexe comprises a cloak-room in addition to a bath-room and lavatory, while there is also a store-room on each floor to the north of the corridor.

(c) The laundry block, which is situated some distance to the east of the main building, is a very substantial stone structure comprising :—

An ironing room.

A washing room.

A disinfecting apparatus, so arranged as to provide separate accommodation for infected and disinfected articles.

An engine and dynamo room ; and

A battery room.

There are, as will be seen by the plate, some admirable *liegehallen* and shelters in the grounds. One of these *liegehallen* extends, on the ground level, from one block to the other, while above it is another *liegehalle* affording capital views of the surrounding country. This shelter, which is a copy of a Japanese temple, was the gift of Lady White, of Bristol. Both these *liegehallen* are well lighted and ventilated, electric illumination being provided in each.

Warming is provided for by low pressure hot water pipes, and the water supply is derived from the mains of the neighbouring Water Company, there being, however, a service reservoir on the site.

Artificial light is supplied by electricity generated in the laundry block.

The sewage is treated on the estate at a biological installation erected for the institution.

Sputum is mixed with sawdust and destroyed by burning.

The original estimate of the cost of the undertaking was as follows :—

	£
Purchase of 50 acres of land (freehold)...	2,102
Levelling and stacking stone quarries ...	1,049
Contract for building administrative block for 60 patients, and ward block for 20 beds ...	6,877
Estimated cost of two blocks for 20 beds in each block	6,000
Laundry and house for electric light plant ...	1,000
Electric light installation	750
Furniture	1,500
Water tank and pipes, &c.	350
Rest pavilion	400
Other expenses	1,972
Total ...	22,000

But as has been said unforeseen circumstances have brought the total cost up to some £32,000.



GENERAL VIEW OF THE WINSLEY SANATORIUM.

(To face page 518.)

The administrative body of the Sanatorium has determined that for a capital contribution of £250 it shall be competent for any local authority, or other body, to practically purchase a bed at the institution, and that in order to maintain a patient in such bed an annual contribution of £65 shall be required.

Contributions to this extent give—

1. The sole right of nomination to one bed.
2. The power of appointment of a Trustee for the land and building.
3. The power of appointment of a member of the Committee of Management.

In the above sense the following local authorities have undertaken to support beds :—

—	Capital Contribution.	Annual Contribution.	Number of Beds.
	£	£	
Bristol Corporation	5,000	1,300	20
Bath Town Council	500	130	2
Swindon Town Council	500	130	2
Gloucester Town Council	250	65	1
Highworth Rural District Council	250	65	1
Cirencester Rural District Council	250	65	1

Of the above local authorities, Bristol Town Council, and Cirencester and Highworth Rural District Councils, have, after public inquiry, obtained sanction from the Local Government Board to borrow money to make the capital contribution ; the other local authorities are presumably making the contribution out of current rates.

I understand that, owing to the actual cost per bed having, as shown above, been very materially in excess of £270, certain of the authorities have made an additional grant to the institution.

In addition to these local authorities there are business firms and other bodies who are subscribing for beds, such, for instance, as—

Messrs. Fry & Sons	1 bed.
Mr. and Mrs. W. S. Clarke	1 „
Mr. J. Bright Clarke	1 „
The Dean Testimonial Fund, Swindon	1 „
Trowbridge Town (district fund) ...	1 „
Bradford-on-Avon Town (district fund)	1 „
Salisbury and South-West Wilts (district fund)	1 „
Cirencester Town (district fund) ...	1 „
The Railway Men, G.W.R., Swindon...	2 „
Bristol Tramways Company	1 „
Mr. G. Lysaght	1 „

Every effort is made to secure only early and suitable cases ; the medical man who fills up the Certificate being earnestly

entreated *not to recommend* the case unless there is a reasonable prospect of *permanent* benefit. *Advanced cases of lung disease cannot be admitted.*

Cost of Maintenance.

In the statement of the Finance Committee, which accompanies the first annual report, the following details are furnished. Allowing an average of 55 patients, the cost per patient per week works out as follows :—

	£	s.	d.
Maintenance (board)	0	10	8½
Surgery and dispensary	0	0	7
Domestics	0	3	3
Establishment charges	0	1	0½
Salaries and wages	0	6	9½
Management	0	1	1
Miscellaneous	0	0	11½
	<u>£1</u>	<u>4</u>	<u>4½</u>

It is pointed out that to the above has to be added sums for interest on debt, depreciations, renewals, &c., &c.

Persons resident in either Somerset, Gloucester, or Wilts, or in the City or County of Bristol are charged £1 15s. 0d. per week ; persons not so resident, £2 10s. 0d.

Immediate Results.

The following table is compiled from the first two annual reports of Dr. Dunbar Townroe, the late Resident Medical Officer :—

Year.	Total.	Arrest.	Much improved.	Improved.	Un-improved.	Died.
1904-5 ...	131	49	33	30	17	2
1905-6 ...	195	41	82	47	24	1
Total ...	326	90	115	77	41	3

On admission the majority of the patients are nursed in their rooms for a week or more ; after this they are daily allotted a certain amount of regulated exercise. Towards the end of their stay male patients are given various tasks, such as hill climbing, carpentering in the woods, gardening, &c., while to the female patients domestic duties, such as making their beds, and preparing the dinner tables.

As regards the question of "cure," Dr. Townroe observes in his first annual report :—

I cannot impress too strongly upon those who have undergone the treatment at Winsley the absolute necessity of carrying out, as far as lies

in their power, the rules of life taught them at this Sanatorium. More than any other, phthisical patients are subject to relapse, and it is only by adhering strictly to the mode of life followed here that they can hope to pursue their several occupations for any length of time. We only strive to put these under our care on the road to complete recovery, being well repaid in our efforts if we can certify an arrest of disease at the end of three or four months. This period is too short in which to hope for a "cure," seeing the chronicity of the disease in so many cases. But if by treatment we can arrest the disease and build up the constitution of a patient, we at least expect that he will repay our efforts by carrying on the treatment in his after life and acting as an intelligent focus of hygienic principles amongst his fellow creatures.

After-results.

The Sanatorium was opened in November, 1904, and between that date and the end of 1906 there were 355 patients discharged. With reference to these cases the Resident Medical Officer makes the following observations in his second annual report:—

Of these, 97, or 27 per cent informed us of the fact that they were at their several occupations at the end of four months from the date of their discharge. Many patients had changed their address, and as several had gone abroad it is probable that there were others at work. Again, many of these, it is fair to state, had changed their former employment, and a fair percentage were working short hours.

At the end of six months 62, and at the end of nine months 53 were working. Finally, at a period of 18 months after discharge reports have reached us that 64 patients, or 18 per cent., have been at work for periods ranging from nine to 18 months.

Dr. Townroe adds that he subsequently hopes to present a detailed account of the occupation of these patients. He states that over 100 patients continue to pay visits for periodical examination and are still carrying out treatment on the lines laid down at Winsley. Many of them will, it is hoped, soon be fit to resume their old occupations.

After-care.

The second annual report states that the attempts made to obtain suitable work on discharge have met with marked success, for the employers have frequently acted upon the advice given them from the Sanatorium.

With a view of aiding the medical attendant in the selection of suitable cases, the instructions subjoined are forwarded with every Certificate sent out from the Central Office.

Rules for the Admission of Patients.

1. Only patients suffering from Pulmonary or from Laryngeal Tuberculosis in the early stages, or where a reasonable prospect is afforded of marked alleviation or cure by treatment in the Sanatorium, will be admitted.

2. Patients will not be eligible for admission to the Sanatorium unless *bond fide* residents in one or other of the Counties of Somerset, Gloucester, or Wilts.

3. Only those persons who are not recipients of Poor Law relief, but who are unable to pay more than 15s. per week, are eligible as patients.

4. No patient will be admitted under 10 or over 60 years of age.

5. The admission of patients to the non-maintained beds will be considered by the Committee of Management strictly in the order in which they are received, but the Committee reserve power to decline any application if in their uncontrolled discretion they shall think fit, and they shall not be called upon to give any reason for so doing.

6. No patients will be admitted without Certificates from his or her medical attendant and from a member of the Medical Consultative Board of the Sanatorium, in the forms hereinafter set forth, together with an Order from the Secretary.

7. Patients who have not been nominated to maintained beds will be required to pay a sum of 10s. per week, which must be paid monthly in advance, the balance of such deposit to be refunded if the patient has for any cause other than misconduct to leave the Sanatorium before the completion of the term.

8. Patients will, as a rule, be admitted for a period not exceeding 16 weeks, but this period may be curtailed by the Committee of Management if it is deemed advisable, or may be extended for a further period under special circumstances.

9. All patients must conform to the Rules and Regulations of the Sanatorium. Any patient who persists in violating Rules, or is otherwise guilty of insubordination or gross misconduct, becomes liable to dismissal.

10. Travelling expenses shall be defrayed by the patient.

11. Applications for admission must be made to the Secretary, at the Offices of the Sanatorium, 84, Park Street, Bristol.

12. All patients must provide themselves with articles of clothing in accordance with a list which will be forwarded by the Secretary before admission, and all such articles are to be clearly marked with the patient's name.

Instructions to the Medical Attendant of Candidates for the Winsley Sanatorium.

You are requested to read carefully the "Classification of Cases" adopted, and the suggestions as regards "Suitability of Cases."

The following is the "Classification of Cases" adopted :—

1. "Good Cases." Full working capacity may be restored without much fear of relapse if reasonable care is taken.

2. "Hopeful Cases." A good chance of regaining working capacity exists, although not perhaps in four months' treatment. Risk of relapse greater, caution will be needful for a longer time.
3. "Some benefit may be expected." Cases of long standing, and with much lung affected. Improvement more or less lasting according to the life led. Will only be fit for very easy light work under favourable conditions.
4. "Unsuitable Cases."

The following suggestions as regards "Suitability of Cases" should be borne in mind :—

1. The most suitable case for a course of treatment limited to sixteen weeks is one newly detected, and found to have nothing more than signs of consolidation at one apex, or some similar lesion.
2. Cases with a greater extent of one lobe of one lung affected. These may do sufficiently well.
3. Cases with fair extent of disease in one lobe and slight disease in a second might be admitted, but only if otherwise the indications are favourable, and if there is a prospect of carrying out after-treatment for the requisite time.
4. Cases complicated with laryngeal disease should be admitted only if the affection of both larynx and lung is in an early stage.*
5. Cases with disease dating back for several years should be excluded.

Your report on the case should be sent under closed cover to any member of the Medical Consultative Board whom you may select, and to whom the patient is to go for the second certificate as to fitness for Sanatorium treatment at Winsley."

Note from Annual Report for 1906 of Medical Officer of Health of Bath.

Eight cases have already occupied the two beds maintained by the Corporation of Bath. Like most of the cases so far under treatment, these were not the best class of case for treatment, being too advanced. The number of applications for the beds have been too few to admit of selection. This is surprising considering the number of persons who must be suffering from phthisis and who ought to be under medical observation.

* (N.B.—A detailed description of the site and extent of the laryngeal disease is desirable.)

THE WORCESTERSHIRE SANATORIUM AT KNIGHTWICK.

(Opened November, 1902.)

This institution, which was opened by the Countess Beauchamp on November 17th, 1902, owes its initiation and erection largely to the efforts of Dr. Fosbroke, the Medical Officer of Health of Worcestershire, and Dr. H. E. Dixey, the present Chairman of the Sanatorium Committee.

The realisation of the scheme became possible mainly owing to the generous offer of Mr. J. Dangerfield, of Bilston, Staffordshire, who offered his house at Knightwick, together with 30 acres of land, rent free for five years, to the County Council of Worcestershire.

The County Council, however, felt themselves unable to accept the responsibility of the undertaking, and Mr. Dangerfield then renewed his offer to the Committee of the Worcestershire Association for the Prevention of Consumption, by whom it was gratefully accepted.

A subscription list was then opened to provide funds for the erection of two wooden pavilions, and to this fund the Worcestershire County Council contributed £300. In 1906 the freehold of the whole estate was acquired.

The site, which occupies the slopes of Ankerdine Hill, is situated on the Upper Silurian Rocks at an elevation of 310 feet above Ordnance Datum and commands a very extensive view of the surrounding country. It is easily reached from the Knightwick station of the Worcester and Bromyard railway.

The accompanying illustrations, for which I am indebted to Dr. Fosbroke, convey a good general idea of this institution.

The sanatorium comprises the previously existing dwelling house, a substantial and conveniently constructed building now used for administrative purposes. In connection with this is an additional kitchen in which is a large range for supplying hot water to the wards, &c. There are also a coach-house and other out-buildings, and near the entrance to the grounds a substantial lodge. To the north and south of the administrative block are two pavilions: the one for males and the other for females. These pavilions are constructed of wood raised upon a brick base, with dimensions in each instance of 85 ft. by 25 ft. by 16 ft. The roof is of corrugated iron. Each pavilion is divided into eight separate rooms, measuring 10 ft. by 10 ft. by 8 ft., i.e., 800 cubic feet per bed, and which open in front on to a covered verandah seven feet wide and behind into a corridor four feet wide. As a routine practice the patients sleep on the covered verandah. Each pavilion is furnished with a bath, three lavatory basins, and two w.c.'s.



THE WORCESTERSHIRE SANATORIUM, KNIGHTWICK.

(To face page 524.)



THE WORCESTERSHIRE SANATORIUM, KNIGHTWICK.

(To follow plate facing page 524.)

Maintenance Account, 1906.

RECEIPTS.		EXPENDITURE.	
	£ s. d.		£ s. d.
Donations	135 17 8	Deficit on 1905-6 accounts ..	123 7 7
Subscriptions	1,336 7 0	Meat, Fish, and Vegetables ..	361 11 10
Patients' Contributions	134 15 0	Groceries and Household Requi- sites ..	308 9 4
Sale of Fruit and Stock	97 2 11	Drugs and Medical Requirements ..	38 5 6
Sundry Receipts	12 10 0	Printing and Stationery	55 12 1
Deficit	125 11 8	Postages	33 7 9
		Coal and Coke	45 6 0
		Oil	22 7 7
		Estate Requirements	135 5 10
		Hauling and Carriage	23 16 4
		Rent, Rates, and Insurance ..	39 15 2
		Salaries	220 5 0
		Wages	335 19 2
		Furniture, Linen, &c.	35 3 1
		Repairs and Renewals	26 15 7
		Laundry	90 16 3
		Miscellaneous Expenses	14 0 0
	<u>£1,802 4 1</u>		<u>£1,802 4 1</u>

The Accounts of the Institution to the 31st December, 1906, of which the foregoing is a Summary, have been examined with the Vouchers produced and are hereby certified to be correct.

HUBERT A. LEICESTER,
Chartered Accountant.

Worcester, 7th January, 1907.

It would appear that the cost per bed, exclusive of the cost of the site and of the buildings already on the site, and exclusive also of any rent, has been, approximately speaking, £130. But it will be obvious from the figures that an additional number of beds could be provided at a lower cost, as is shown by the fact that the Committee are asking for only £400 for the erection of an additional pavilion for eight beds.

As regards maintenance, it would appear that the cost per bed was about £108 during the first year of the operations of the Institution. The cost, however, has since become materially reduced, and in 1906 it amounted to £1 10s. 1d. per week.

Among the Poor Law authorities which have subscribed are—

The King's Norton Board of Guardians,
The Bromsgrove " "
The Worcester " "



ONE OF THE PAVILIONS.

(To face page 526.)

but during 1906 only the latter retained a bed. Support has also being given by the following Friendly Societies—

The Worcester District of Oddfellows,
The Worcester „ „ Foresters.

Large employers of labour are also among the subscribers, and Local Sanatorium Committees have been formed at Malvern, Evesham, Worcester, Oldbury and Redditch. Such Committees retain the right of a free bed for their district.

Conditions of Admission.

In order to obtain admission, patients must satisfy the Committee that they are unable to pay the charges made at private sanatoria, and that they are in such a stage of the disease as to afford reasonable expectation of improvement or cure.

All applicants for admission must be examined either by their own medical adviser or by a medical man appointed by the Local Committee, and be certified as in a fit state to be admitted to the sanatorium. Such certificates are laid before the House Committee, which decides whether or not the case shall be admitted.

The right of nomination to a free bed may be secured for 12 months by an annual contribution of £75, for six months for £40, and for three months for £20.

Selection of Cases.

In his annual report for 1904, Mr. J. H. Greensill, the Medical Superintendent, states that the Committee have made arrangements by which some cases can be sent to the Worcester Infirmary for a short time for observation before being admitted to the Sanatorium, and he thinks, therefore, that in future the proportion of hopeful cases to the total number of advanced cases admitted will be greater than formerly.

As regards cases falling into group 2, i.e., "more severe" cases, Mr. Greensill in his annual report for 1905, states that :—

In these cases it is impossible without prolonged observation to give any definite forecast as to the probability of their re-acting to Sanatorium treatment, and it is for such patients that this arrangement has been made with the Worcester Infirmary, by which cases are admitted to that institution for preliminary treatment and observation before coming to Knightwick.

Even extensive disease in the lungs does not preclude the possibility of prolonged working capacity and, if whilst in the Infirmary, it is found that there is a probability of the disease being limited, these cases are, after a few weeks observation, transferred to Knightwick.

On the other hand, cases in which the disease is not only extensive, but found to be acute and advancing, are refused admission to the sanatorium.

Results of each year's work.

As regards the duration of stay, the Medical Superintendent states that generally speaking early cases require from three to four months' treatment; advanced cases considerably longer. He groups his cases into (a) Early; (b) More advanced; (c) Very bad, and the results are summarised on this basis.

Immediate Results.

Table showing results during each of the four years 1903-1906:—

Discharged.					Arrested.	Much Improved or Improved.	Improved Slightly.	No Improvement.	Unsuitable.	Dead.	Left.
1903	(a)	19	...	...	18	1	—	—	—	—	—
	(b)	11	...	...	—	11	—	—	—	—	—
	(c)	6	...	...	—	—	1	2	3	—	—
	Total	36	...	...	18	12	1	2	3	—	—
1904	(a)	16	...	...	14	—	—	—	—	1	1
	(b)	12	...	...	—	7	3	—	—	1	1
	(c)	7	...	...	—	3	1	3	—	—	—
	Total	35	...	...	14	10	4	3	—	2	2
1905	(a)	21	...	...	14	1	1	—	—	—	1
	(b)	17	...	...	4	8	—	3	—	1	1
	(c)	6	...	...	—	2	—	4	—	—	—
	Total	44	...	...	22	11	1	7	—	1	2
1906	(a)	15	...	...	Doing well and report health as satisfactory. Improved during treatment, and at end of 1906 improvement maintained in 14 cases. In two cases considerable improvement, but in other six no real improvement.						
	(b)	17	...	...					
	(c)	8	...	...					
	Total	40	...	...					

(a) = "Early" cases where permanent benefit was expected.

(b) = More severe cases.

(c) = Advanced cases admitted on probation.

The term "arrested" is used when a patient on discharge has no fever, no expectoration, and no signs of active disease in the lungs.

After Results.

All cases considered together with the exception of 29 cases admitted on probation :—

Year.	Total.	Condition in December 1906.			
		At work.	At Home.	Dead.	Untraced.
1903	43	16	5	20	2
1904	44	18	10	16	—
1905	54	32	16	5	1
1906	32	23	9	—	—
Totals	173	89	40	41	3

If the 29 cases admitted on probation be added, the totals become somewhat as follows :—

Totals	202	89	48	62	3
---------------	-----	----	----	----	---

Differentiation between “ Early ” and “ More Severe Cases.”

After Results.

“ Early Cases.”

Year.	Total.	Condition in December 1906.			
		At work.	At Home.	Dead.	Cannot be traced.
1903	22	16	3	2	1
1904	23	18	2	3	—
1905	28	24	4	—	—
1906	15	14	1	—	—
Totals	88	72	10	5	1

The annual report for 1906 states that “ of these early cases no less than 94 per cent. are (and have been in some cases for nearly four years) in good health, and 82 per cent. of these cases are at work.”

"More Severe Cases."

Year.	Total.	Condition in December 1906.			
		At Work.	At Home.	Dead.	Cannot be traced.
1903	21	—	2	18	1
1904	21	—	8	13	—
1905	26	8	12	5	1
1906	17	9	8	—	—
Totals	85	17	30	36	2

As to these cases the annual report for 1906 observes, as was to be expected, "the results in these cases could not be so satisfactory, and but 17 are able to continue work. Where this is otherwise it should not be forgotten that lives have been prolonged, and further, patients have been educated to live such a life as would not only benefit themselves, but lessen the risk of infection to others."

Advanced Cases admitted on Probation.

Of 29 cases under this heading "21 are dead ; in no case was any permanent benefit expected, nor has any lasting good been done to these patients by their admission."

Employment for Patients.

The question of some sort of employment has been under consideration, and during 1906 the majority of the patients were able to undertake some light work in connection with the Institution.

The After-care of Patients.

An attempt is being made to organise a system for providing suitable employment for discharged patients.

THE BRADFORD POOR LAW SANATORIUM AT SKIPTON.

(Opened November 3, 1903.)

This Sanatorium was erected by the Bradford Board of Guardians under the provisions of an Order of the Local Government Board, dated November 30th, 1901. The institution is situated at Eastby, a short distance to the north-east of Skipton, on a commanding site (of over seven acres) at an elevation of some 930 feet above Ordnance Datum. It is protected on the north

and north-west by the hills on the southern slope of which it is built.

As the Sanatorium grounds are somewhat exposed, especially in winter, sanction has been obtained from the Duke of Devonshire, for the patients to take exercise in a certain portion of the adjoining wood.

The buildings, which face south-east, consist of a two-storied administrative block, constructed of stone, providing accommodation for the Medical Officer and Matron, and for general administrative purposes. Attached to this building is the dining-room for the use of the patients. There is at present but one pavilion erected. This is a "temporary" one-storied wooden structure providing accommodation for 26 patients and containing four single bedrooms, four two-bedded, one four-bedded, and two five-bedded wards; the cubic space per patient being about 1,200 cubic feet on the basis of 26 beds. Steps, however, have been taken to increase the number of beds by seven, making a total of 33 beds. Through ventilation is provided for in each ward. The roof is tiled, and the interior of the walls is composed of Bruckner's fire-proof plates. No verandahs are provided owing to the belief on the part of the designer that such structures cut off light, increase the heat of the wards in summer, and encourage the patients to spend their time in the vicinity of the rooms. It is proposed eventually to erect another pavilion, and to complete the scheme as shown in the accompanying plan. There will then be accommodation for 52 patients. Electric lighting is provided for by an oil engine dynamo and storage batteries, and warming by means of a low pressure hot water system.

There are two *Liegehallen* in the garden to the east of the sanatorium.

The water-supply is from a well sunk in the grounds, the water being pumped up to a service reservoir by means of a windmill, supplemented by an electric motor in still weather.

Mixed excrement is disposed of in earth closets, and the urinals are conical cloth filters filled with sawdust, this arrangement being on Dr. Vivian Poore's system. Slop-water is conveyed to the garden by open stoneware channels and treated by irrigation.

The Sanatorium is primarily intended for the inmates of the Bradford Union Workhouse, and is regarded as a branch of the Union Hospital. But it is very important in relation to the Poor Law aspect of the Sanatorium problem to note that admission to the Union Hospital is not an essential antecedent to admission to the Sanatorium.

Dr. Ralph Crowley, the Medical Officer of the Workhouse, to whom I am much indebted for assistance, was the first chief executive officer of the Sanatorium, without whose consent no patient can be admitted thereto. But there is also a Resident Medical

Officer, Captain Luard, I.M.S., who was good enough to render me valuable aid when I visited the institution in 1905. Captain Luard attaches, he tells me, more importance economically to the married than to the unmarried patients, inasmuch as the inability of the married to work throws the whole family on the rates.

There is no definite limit to the stay of patients in this institution, the matter being left entirely in the hands of the Medical Superintendent. The average duration of stay would appear to be about six months. At the date of my last visit in July, 1905, three patients had been in the institution from 12 to 20 months. Although the institution belongs to the Bradford Board of Guardians, arrangements have been made by which the Guardians of the Keighley and Skipton Unions may secure the right to nominate patients for six beds.

The cost per bed, excluding the cost of a laundry and porter's lodge which it may be found necessary to erect, is estimated at £230.

The staff consists of a Resident Medical Officer, a Matron, two nurses, three maids, one handyman, and one gardener.

Results.

The first annual report of the Sanatorium was presented by Dr. Ralph Crowley to the Board of Guardians on September 6th, 1905, and it relates to the period from November, 1903, to June 30th, 1905.

During this period there were 83 admissions and 55 discharges. Of the 55 three had been re-admitted and were resident in the Sanatorium at the date of the first annual report.

Having regard to the importance of the work of this institution as affording information to other Boards of Guardians contemplating the provision of Sanatoria, I furnish in some detail an abstract of the first annual report.

The 83 patients on admission into the Sanatorium were grouped as regards stages of the malady by Dr. Crowley into three classes.

Class A.—Early (corresponding to the early involvement of part of one lobe of one lung).

Class B.—Moderately advanced (corresponding to the involvement of the whole of one lobe of one lung with or without slight involvement of the other lung).

Class C.—Advanced.

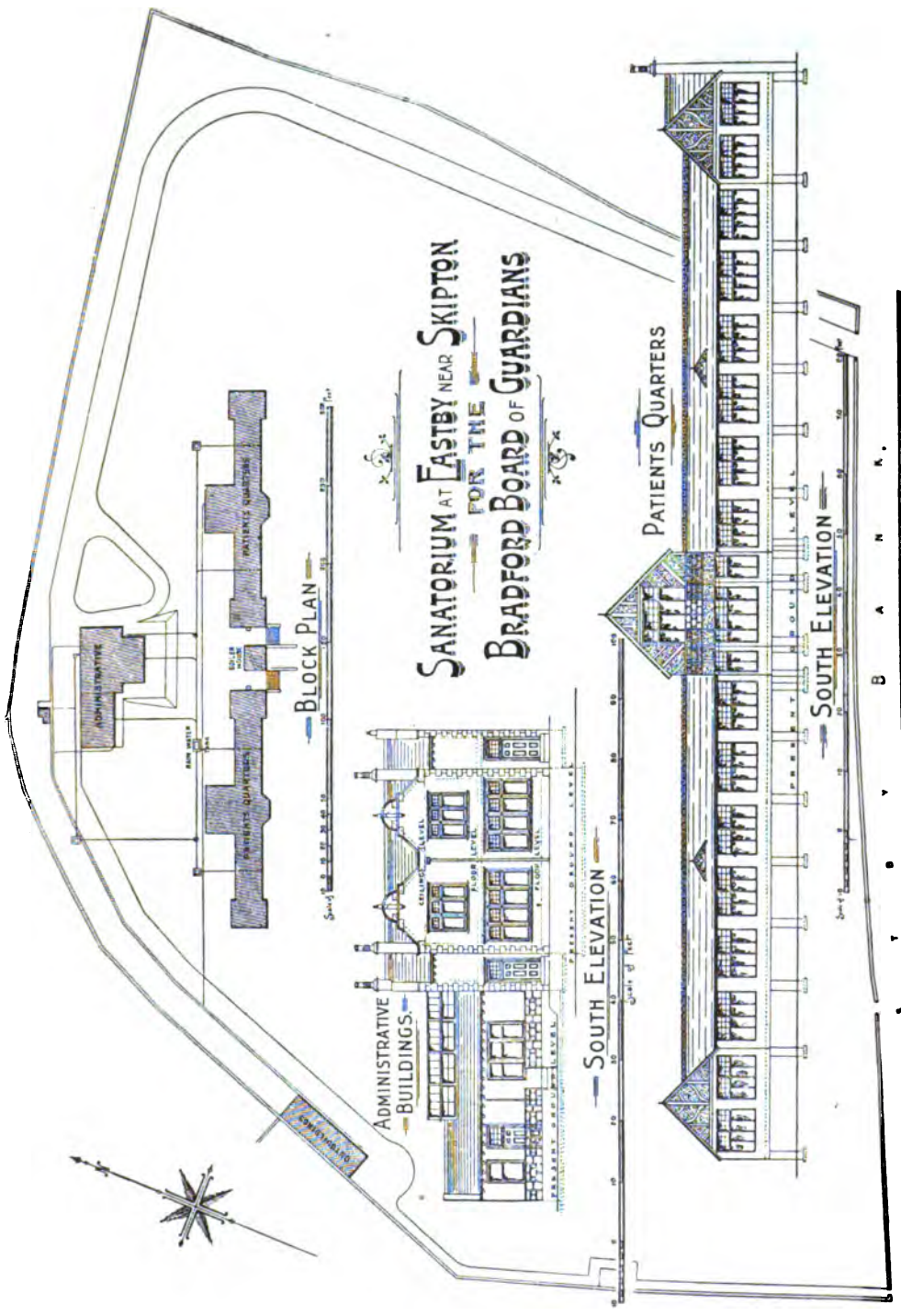
Omitting one case of tubercular pleurisy, the remaining 82 cases were thus to be divided on admission:—

	Class.	Total.	Per cent.
Class A	24	29
Class B	43	53
Class C	15	18



BRADFORD UNION SANATORIUM.

(To face page 532.)



(To follow plate facing page 532.)

It is pointed out in Dr. Crowley's report that less than one-third of the total number of patients could be regarded on admission as early cases, and it is added that most of the cases in Class C were admitted into the institution in the earlier months of its work, and at a time when there were several vacant beds.

With regard to the 24 patients comprising Class A, the report states that only seven were admitted during the first year, but that since the issue of a circular to medical men in November, 1904, informing them "that patients could be sent to the Sanatorium without first going through the Union Hospital (unless some special reason made this desirable) a much larger proportion of such cases has been recommended."

The significance of this statement is important.

The condition of discharge of the 55 patients who left the institution during the period to which the report relates was as follows :—

—	Pro- visionally Cured.	Much Improved.	Improved.	Not Improved.	Died.
Class A ...	10	8	1	5	—
Class B ...	1	6	8	6	—
Class C ...	—	4	5	3	1
Total ...	11	18	14	9	1

This table accounts for 53 cases, one of the remaining two having developed general paralysis of the insane, and the other being the case of tubercular pleurisy already referred to, and who was discharged provisionally cured.

Exclusive of the ten patients in the last two columns, none of whom improved, the average *gain in weight* was :—

Class A 1 stone 1 lb.,

Class B 1 stone,

Class C 1 stone,

the individual gains varying from a few pounds to just under three stone.

The following table, which relates to the reasons for which the patients were discharged, is of interest as showing the difficulties which in the first instance are apt to beset the administration of institutions drawing their supplies from the pauper class :—

Discharged by doctor	33
Went out against doctor's wishes, being anxious for the most part to get work	10
Died	1
Discharged for getting drunk	6
Discharged for disorderly conduct	5

Dr. Crowley adds that the discharges for drunkenness and disorderly conduct are likely to be very few in the future, since increasing care is being exercised in the selection of patients.

In this connection it will be instructive to summarise the comments contained in the report relative to the alcoholic or non-alcoholic habits of the patients admitted. They have been grouped into "Abstainers," "Moderate Drinkers," and "Drinkers to Excess"; this last group comprising patients who themselves admitted the justice of their classification.

	Degree of Disease.				
	A.	B.	C.	Total.	Percent
No history obtainable... ..	2	7	4	13	16
Abstainers:—					
Under 18 years of age	2	3	3	8	10
Over 18 years of age	6	3	1	10	12
Moderate Drinkers	7	17	1	25	30
Drinkers to excess	5	14	7	26	32

Length of Stay in Sanatorium.

Class A ... average of 14 weeks (from 1 to 8 months).
 Class B ... average of 22 weeks (from 1 to 16 months).
 Class C ... average of 22 weeks (from 1 to 11 months).

After Results.

The relatively short period during which the Sanatorium has been open renders it impossible, Dr. Crowley states, to say anything very definite under this head, more particularly when the distinctly unsatisfactory nature of the cases admitted during the first year is taken into consideration. But he considers that the character of the cases admitted during the second year renders it certain that better results will subsequently be obtained.

He has, however, made inquiries relative to the subsequent history of 33 cases which have left the institution for a period of more than six months (6-15 months), and with reference to the following table he points out the importance of noting that out of the 19 patients belonging to Class A who have left the institution only seven figure in the table owing to the fact that the remaining 12 included in the total of 22 patients have left for a period of less than six months.

—	A.	B.	C.	Total.
Not traced	2	4	—	6
Well and working	4	3	1	8
Condition much as on discharge and unable to do other than very light work.	—	2	4	6
Ditto, but in full work	—	1	—	1
Very ill	—	—	1	1
Disease returned	1	—	—	1
Dead	—	7	3	10
Totals	7	17	9	33

Dr. Crowley has found it difficult to follow up the addresses of discharged patients; and he suggests that for the future the names and addresses of two relatives, or, failing them, of intimate friends, should be obtained at the time of each person's admission, so that the subsequent tracing of patients may be facilitated. He considers that every discharged patient should be visited or inquired after every three months, a record being kept as to the results of such inquiries, as, he adds, such a record would eventually prove of great value.

The Sanatorium has, the report states, proved admirably adapted structurally for its purpose, but the unprotected situation of the institution, and the large amount of wind to which it is thereby exposed, renders it unsuitable for patients having any complication such as chronic bronchitis and emphysema. It is best suited "for comparatively healthy men in the early stage of the disease, for whom it was primarily intended."

As to after-results, a further note has now been added on page 539, and it tends to show that more careful selection of cases, and the exclusion of persons who would formerly have been admitted is yielding better results.

The second annual report deals in general fashion with the cases, as Dr. B. H. Slater the present Medical Superintendent regards the period during which the sanatorium has been in operation as too short to render a detailed report desirable.

The following were the channels through which the patients in 1905 were admitted to the sanatorium, and the list brings out the fact that half the cases were admitted direct from their homes and not *via* workhouse or infirmary:—

From Bradford Union Hospital	...	...	20
„ Central Home	...	...	1
„ patients' own homes	...	...	29
„ Skipton Union	...	...	1
„ Settle Union	...	...	1
„ Pontefract Union	...	...	4
„ Halifax Union	...	...	1
„ North Bierley Union	...	..	2

Table showing condition on discharge of 39 patients who left the sanatorium from July 1st, 1905, to June 30th, 1906 :—

Total.	Provision- ally cured.	Much im- proved and fit for work.	Discharged at own request.		
			Much improved and fit for work.	Slightly improved.	Unimproved.
39	18	4	6	3	8

The second annual report contains no figures relative to after results.

Cost of Maintenance.

The average weekly cost per head for the year ending March 31, 1905, was as under :—

	£	s.	d.
Maintenance	1	5	9½
Establishment Charges	0	8	8½
Repayment of Loan	0	9	0
	£2	3	5½

As regards the most recent figures, the following table, with which Mr. George M. Crowther, the Clerk, has kindly furnished me, will be of interest :—

Statement as to Expenditure, Cost per Head, &c., during half-year ending March, 1906.

Digitized by Google

Employment for the Patients.

The garden of the institution provides ample opportunity for suitable work on the part of the patients, and I gather from the report, as also from Captain Luard, the Resident Medical Officer, that although there are considerable difficulties in getting the poorer classes to appreciate the fact that well-regulated and supervised work is for the benefit of their health, an increasing amount of such work is being performed by patients.

Comments by Dr. Crowley in First Annual Report.

Having regard to the interest which attaches to the problem of the provision of Sanatoria for the pauper class, I herewith reproduce verbatim Dr. Crowley's views with respect to the conditions which, in his opinion, would be likely to diminish the prevalence of consumption.

"The problem of how to deal with the consumptive poor still remains far from solved. It needs to be considered from the point of view of—

- (1) The worker in the early stage of the disease for whom Sanatorium treatment holds out a good prospect of cure, and who being able, within limits, to choose the situation of his house, &c., and possibly his kind of work, can hope to return to the ranks of the worker.
- (2) The worker in a later stage where, though great improvement may be brought about, relapse is all too likely if he has to return to his former conditions of work, and yet who under somewhat more favourable conditions might be able largely to support himself and family.
- (3) Patients in advanced stages who cannot hope to be wage earners again, and who, left in their own homes, form directly or indirectly very serious centres of infection for those around them.

A Sanatorium, such as that at Eastby, amply provides for the needs of the first class. It will also provide for a certain number of the second, but a large proportion of this class need separate consideration if they are not going to fall into class three. What is needed, were such a project feasible, is provision on the colony system. The patients would be removed with their families from the hopeless influence of the life of a manufacturing city, and at the same time would be employed in work suitable for them, and carried out under medical supervision and control. Many of this class could in this way live useful and prolonged lives.

From the point of view of prevention, the dealing with Class C is of great importance. I am of the opinion that every inducement should be given to many of the patients to leave their homes, for, whatever may be urged theoretically, I am sure that practically they will, in their homes, remain centres of infection. The only provision at present for such patients is the workhouse hospital, but, as is well known, many who ought to be removed from their homes refuse to go where so many of the worst classes of the community drift.

Further, the accommodation for such patients at the hospital is extremely inadequate, allowing practically no possibility of suitably classifying them, and, as I have had occasion to urge before, the advisability of erecting a special building for phthisis patients on a site so much in the city, and in the future likely to be still more so, and where the winter fogs are frequent, leading to days and nights of much distress, appear very doubtful.

Were such a course possible, I am of opinion that the right thing to be done is for the city to erect accommodation for advanced cases of phthisis on some site not far removed from the city, and yet far enough to escape

the polluted atmosphere. Probably from 100 to 150 beds would be required. Such a triple scheme, the Sanatorium, the Colony, and the Hospital for Advanced Cases, will probably appear Utopian, and quite out of the question on the ground of expense. Taken along, however, with a much more vigorous carrying out of preventive measures, such as will come about when the public becomes alive to the necessity and really grasps the fact that the disease can be prevented, such a system and such measures might well be expected to make consumption in, say, a couple of generations practically a disease of the past. On the score of expense, too, it is well to remember what a great loss to the community is the death in active manhood of so many citizens."

Comments by Dr. B. Holroyd Slater in Second Annual Report.

The Medical Superintendent states :—

"It is a lamentable fact that many of our patients, whilst improving greatly in physical condition, degenerate morally and acquire a distaste for work. This, however, has not been so marked since the plan was introduced of requiring each patient considered fit for discharge to undertake a month's work of six hours per day in the garden as a test of his physical fitness for his return to the ordinary work and mode of life. At first many 'passive resisters' preferred the risk of town life to the dreadful idea of work in holiday time, but all the patients now fully realise the beneficial character of the arrangements as being both preparative and probative for their return to active life.

"How to provide suitable occupations for those discharged from the sanatorium as 'cured' is still a very difficult problem, and until it is solved the sanatorium is shorn of half its usefulness. A few of our patients have been fortunate enough to secure outdoor employment as gardeners, drivers of vans and motor cars, and so on, but the bulk of them have no option but to return to their former in-door occupations, their unhygienic dwellings, and a probable recrudescence of their terrible disease.

"The question of providing suitable occupation as a complement to the sanatorium treatment is one that merits your closest attention."

Later Note as to After-Results.

Since the above was written a summary of the work of the sanatorium since its foundation has been drawn up by Dr. Holroyd Slater, and a synopsis of that part of it which relates to after-results may be here furnished.

On June 20th, 1907, this institution had been open $3\frac{1}{2}$ years, and during that time 200 cases had been discharged. But 49 of such cases had left the sanatorium for less than six months, and consequently the after-results deal only with the remaining 151 cases, whose condition in June, 1907, is shown in the following table :—

Total discharged.	In good health and at full work.	Fair health : full work.	Poor health : occasional light work.	Poor health : not working.	Very ill.	Dead.	Untraced.	Return of disease.	In sanatoria.
151	51 or 33 $\frac{1}{3}$ %	10 or 6 $\frac{2}{3}$ %	7 or 4 $\frac{2}{3}$ %	6 or 4%	13 or 8 $\frac{2}{3}$ %	53 or 35 $\frac{1}{3}$ %	24 or 15 $\frac{2}{3}$ %	4 or 2 $\frac{2}{3}$ %	3 or 2%

This table, therefore, indicates that out of 151 patients discharged at intervals from 6 months to 3½ years, a third were at full work and in good health at the time the census was taken. Out of this total of 51 cases, 19 had left the sanatorium from 2½ to 3½ years, and 32 from 6 months to 2½ years.

The figures show, as usual, that the earlier the cases the better the results. Dr. Slater adds:—

“These facts are encouraging. They go far towards proving the permanent character of the benefits derived from sanatoria treatment, *especially in carefully-selected early cases*, and are ample justification for the existence of your institution at Eastby.” He also refers to the educational value of the institution.

It would appear from this report that the character of the cases selected is gradually improving, and Dr. Slater makes the following important observations on this point:—

“The notable improvement in the general character of the patients which this implies must be ascribed almost entirely to the wise policy of the late Board in allowing patients to be sent to Eastby direct from their own homes as well as from the wards of the union hospital. The privilege is met increasingly each year, and not only raises the “tone” of the sanatorium, but at the same time renders it possible to secure a larger proportion of early cases.”

To illustrate this latter period I may say that out of 227 patients sent to me during the last 18 months by medical men in the town, 87 or 38 per cent. were sent to the sanatorium, whilst only 13 of the past years 176 admissions to the male phthisical wards, or about 7 per cent., came up to the arbitrary standard required.

LEEDS SANATORIUM FOR CONSUMPTIVES.

(Opened September, 1901.)

This institution, which has been promoted by the Leeds Association for the Prevention and Cure of Tuberculosis, is situated on the Red Sandstone formation at Gateforth, about three miles to the west of the town of Selby at an elevation of 70 feet above Ordnance Datum, and its work must be regarded as a continuation of that commenced at Askwith and Farnley.

The sanatorium consists of a substantially constructed and well lighted country mansion, situated in an open position with a pleasant prospect.

The estate in which the mansion is comprised was purchased by the Leeds Corporation for the purpose of sewage disposal, but as the place has not been put to this use it has been leased to the Leeds Tuberculosis Committee at a small annual rental. There are now (1906) 34 beds available at the institution,



LEEDS SANATORIUM.

(To face page 540.)

At the date of my first visit, the then Resident Medical Officer, Dr. A. Stanley Parkinson, was good enough to shew me over the Institution, and I am also indebted to Dr. H. de C. Woodcock, one of the Honorary Physicians, for much subsequent information. At my second visit the Matron afforded me much assistance.

Conditions of Admission.

No person is admitted who does not agree to stay two months, unless with the express consent of the medical staff.

A donation of £35 or £70 entitles the donor to nominate to one bed for six and twelve months respectively, and donors of £1,000 may name a bed, and have the right during their lifetime to nominate a patient to occupy such bed in the sanatorium.

The following local authorities and organisations supported the institution during 1906 :—

Leeds Corporation.

Bramley Board of Guardians.

Holbeck

" " "

Hunslet

" " "

Leeds

" " "

Leeds Workpeople's Hospital Fund.

York Branch of National Association for Prevention of Consumption.

Leeds Consumptives Aid Association.

Leeds Industrial Co-operative Society, Ltd.

Cost of Maintenance.

The daily cost of maintenance per patient which in 1901 was 4s. 5d., and in 1902, 4s. 9d. was reduced in 1903 to 4s., in 1904 to 3s. 7½d., and in 1906 to 3s. 0½d.

Results.

—			Total discharged.	Practically cured.	Being greatly improved and fit for work.	Slightly or not at all improved.
1901	...	...	27	14	10*	3
1902	...	...	59	21	24	14
1903	...	...	91	35	40	16
1904	...	...	101	36	48	17
1905	...	...	82	40	35	7
1906	...	...	135	55	52	28
			495	201	209	85

* One of these cases was apparently of a doubtful nature.

Subsequent History of Cases Discharged.

The annual reports relative to the institution do not contain detailed accounts of the after-history of the cases, but the following extracts taken from such reports will convey a general indication of the results obtained.

The second annual report (for 1901), which refers to the 27 cases which had been discharged from the Gateforth Sanatorium, adds—

"The great difficulty which the Association has to meet is undoubtedly the danger of relapse which the patients incur when they return to their homes. These latter are often insanitary, and the patients themselves cannot always obtain the necessary supporting food to maintain their greatly improved state of health. Hence relapse is liable to occur. The ideal which the Committee would aim at is that the patients should follow some outdoor employment, preferably out in the country, for at least 12 months after they leave the sanatorium."

In speaking of the second year's work (for the year ending December 31st, 1902) the third annual report observes:—

"Seven of the bad cases alluded to above, as was only to be expected, since succumbed to the disease. Five of the patients classed as greatly improved have also died."

"The Committee feel it must be recognised that the best permanent results of sanatorium treatment cannot be attained where the majority of the patients must return to unhealthy and poor homes. The problem of finding work for discharged patients has been occupying the attention of the Committee, but its solution is an exceptionally difficult one."

In the fourth annual report (for 1903) it is stated that—

"When the sanatorium treatment was commenced in earnest in this country four years ago, great hopes of cure for most cases in almost every stage of the disease were raised. Now more sober views prevail. Doubtless in incipient cases hopes of complete recovery may be held out, but in advanced cases only improvement (sometimes very considerable in degree) can be looked for and acute febrile cases are mostly uninfluenced by sanatorium treatment. The occasional exceptions to this last-named class require far too long a time to allow a small Institution like Gateforth Sanatorium to admit and keep such cases when there are so many consumptives awaiting admission.

"Relapse is the other source of failure, and this is undoubtedly more likely to occur in cases belonging to the class for which a charitable institution such as ours must cater."

In the fifth annual report reference is made to the value of Armley House (see later) as a means which enables suitable cases for Gateforth to be selected, and the importance of securing cases in the early stage of the disease is emphasised. It is added—

"The value of institution treatment of phthisis is not limited alone to the individual, but it benefits the public at large in the prevention of consumption, and especially among the poorer members of the community."

During 1906 such male patients as were in a suitable state were employed in the garden attached to the Sanatorium in sundry pursuits connected with gardening, in the keeping of fowls and in chair mending; but I understand from Dr. Woodcock that, financially, such employment has not as yet sufficed to

yield a profit on the work done. It serves, however, a very useful purpose, and further experience may yield better results.

The sixth and seventh annual reports contain no references to after results, but it will be noted that approximately 50 per cent. of the patients discharged were "practically cured" in 1905 and over 40 per cent. in 1906.

LEEDS HOME FOR ADVANCED CASES (ARMLEY HOUSE).

In addition to the Gateforth Sanatorium, the Leeds Association for the Prevention and Cure of Tuberculosis, have taken Armley House, a country mansion, situated in 70 acres of land in an elevated position on the outskirts of Leeds, and have adapted the house for use as a Hospital for Consumptives, the total provision at the Home being 44 beds. There are *liegehallen* and shelters for the accommodation of both male and female patients.

Although this house was in the first instance regarded as a home for advanced cases, "a small number of beds, not exceeding one-fourth of the whole, are reserved for patients suffering from acute febrile phthisis, who may subsequently be removed to Gateforth Sanatorium should the disease show signs of arrest." For this purpose a separate building of a "temporary" character has been erected in the grounds comprising four wards containing two beds each.

It is in this latter sense that the Home has been found useful in enabling a decision to be arrived at as to whether a given patient is likely to derive benefit from a sojourn at Gateforth.

During 1904, when the total accommodation was 20 beds, forty-nine patients were admitted into the Home. Seventy-nine were discharged, five died, and three were transferred in the sense indicated above to Gateforth.

During 1905 there were 84 patients in this institution, and out of this number eight were transferred to Gateforth, and 13 of the advanced cases died. This Home has been found of great value in dealing with consumptives from poor and insanitary homes, and the Association have certainly been very fortunate in having secured such a house and estate at the almost nominal rental of £150.

The average cost per patient during 1906 was at the Home 2s. 11d. per day.

It will therefore be seen that the Sanatorium at Gateforth is but a part of the whole system of dealing with pulmonary tuberculosis in Leeds. There is—

1. An out-patient department near the Leeds Infirmary. To this out-patient department patients are sent by the

infirmary, the dispensary, and also by private practitioners. The patients are here divided into 3 groups:—

Group 1 are sent to Armley House, which takes in hopeless cases for isolation and febrile cases for observation. About 25% of these Armley patients are afterwards sent to Gateforth;

Group 2 comprises the early cases which are sent direct to Gateforth; and

Group 3, cases suspected to be tuberculous and which are sent to Armley, and if it appears desirable subjected to the tuberculin test.

The provision for advanced cases at Armley House has been much appreciated, and many patients have undoubtedly had their lives, and, indeed, their usefulness to the community thereby prolonged. It was in the first instance intended to make this institution a Home for the Dying, but experience has shown that this is undesirable, and moreover a number of the patients undergo such material improvement in the Home that they are able to leave it again and in many instances perform some kind of work.

HULL AND EAST RIDING SANATORIUM.

(Opened January 2nd, 1902.)

This institution, which is a separate building erected in connection with the Hull and East Riding Convalescent Home, provides accommodation for thirty tuberculous patients—10 females, and 20 males.

The sanatorium is situated at Withernsea on the Yorkshire coast, a few miles north of the estuary of the Humber.

The establishment consists of a two-storied building comprising two male and two female wards, and a dining-room. Along the south and west sides of each storey is a large verandah upon which the patients pass the night during the summer months. The sanatorium is administered in connection with the Convalescent Home, which adjoins it on the east.

Conditions of Admission.

Patients before admission are required to submit samples of sputum and to be examined by the consulting physician at Hull. The objects in view are, on the one hand, to exclude the non-tuberculous cases, and on the other to reject hopeless cases.

The fees for the first thirteen weeks, which must be paid in advance, are £1 per week.

Results of Treatment.

I am indebted to Dr. A. E. Sproule, the Medical Superintendent, and to Mr. Benjamin Brooks, the Secretary of the institution, for sending me copies of the annual reports.

The annual report for the year ended December 31st, 1902, states that a great difficulty in the case of an institution intended for persons of limited means is that many patients are in the first place not admitted until the disease is well established, and that they are in the second place unable to remain long enough under sanatorium treatment. Many, the report adds, appear to come in only when they can no longer work, and all other means have failed. After leaving the institution these patients must return to work, and possibly to the circumstances under which their breakdown occurred.

During 1902 there were, omitting five re-admissions, 67 patients under treatment; and the following table relative to these cases is abstracted from the first annual report :—

—	Males.	Females.	Total.	Per cent.
Discharged :—				
Disease completely arrested ...	13	6	19	41·3
Improved	8	6	14	30·4
Not improved	8	4	13	28·3
Died	1	—	—	—
Average stay	—	—	—	19 weeks 6 days.
Average weight gained	12·2 lbs.	7·1	—	—
Total discharged	30	16	46	—
Remaining, December 31st, 1902 ...	11	10	21	—

In the second annual report Dr. Sproule discontinues use of the term "Disease completely arrested," reserving it for cases which have remained quite well for two years. In his second and third reports he has substituted for the term "Disease arrested" that of "Very much improved." And in his fourth and fifth reports the term "Much improved" is substituted for "Very much improved" or otherwise expressed the terms referred to denote the greatest improvement made by patients during the years in question.

He adds, too, in his second report, that he is unable yet to furnish any figures as to the after history and progress of patients who have left the institution, as, although nearly all promised to communicate with him, but very few did so.*

* See table furnished at a later date by Dr. Sproule.

The figures for the year 1903 were as follows :—

—	Males.	Females.	Total.	Per cent.
Patients discharged :—				
Very much improved	14	3	17	29·3
Improved	14	10	24	41·4
Not improved	8	8	16	} 29·3
Died	—	1	1	
Remaining	5	3	8	—
Totals	41	25	66	—

Average stay 15 weeks 4 days.

The following table shows the relation of the improvement to the stage of the disease on admission :—

—	Condition on Admission.	Much Improved.	Improved.	Not Improved.
In early stages	12	8	4	—
Moderately advanced	34	9	17	8
Advanced	12	—	3	9
Totals	58	17	24	17

Figures for 1904 :—

—	Males.	Females.	Total.	Per cent. of cases discharged.
Patients discharged—				
Very much improved	8	6	14	29·8
Improved	11	7	18	38·3
Not improved	9	6	15	31·9
Totals	28	19	47	—

Results on discharge in Relation to Stage of the Disease on Admission.

Condition on Admission.	Number.	Much Improved.	Improved.	Not Improved.
In early stages	8	6	2	—
Moderately advanced	31	7	15	9
Advanced	8	1	1	6
Total	47	14	18	15

Average stay was 102·3 days as compared with 109·0 days in 1903.

In the annual report for 1905 it is announced that owing to the generosity of Sir James Reckitt arrangements have been made by which certain patients, who otherwise would be compelled to leave the sanatorium too early, may be enabled to prolong their stay. As a consequence of this arrangement the residence of patients has in many cases been increased from 102 days in 1904 to 134 days in 1905.

Figures for 1905 :—

—	Males.	Females.	Total.	Per cent.
Much improved	13	3	16	42·1
Improved	4	6	10	26·3
Not improved	8	4	12	31·6
Totals	25	13	38	100·0

Average stay 134·0 days as compared with 102·3 in 1904 and 109·0 in 1903.

Results in Relation to Stage of Disease on Admission.

Stage.	Total	Much Improved.	Improved.	Not Improved.
Early	11	8	0	3
Moderately advanced ...	19	8	9	2
Advanced	8	0	1	7
Total	38	16	10	12

Figures for 1906 :—

—	Males.	Females.	Total.	Per- centages.
Much improved	8	5	13	36·1
Improved	4	6	10	27·7
Not improved	9	4	13	36·1
Total	21	15	36	99·9

Average stay 116·23 days as compared with 134·0 in 1905, 102·3 in 1904 and 109·0 in 1903.

Results in Relation to Stage of Disease on Admission.

Stage.	Total.	Much Improved.	Improved.	Not Improved.
Early	7	6	1	0
Moderately advanced ...	22	7	8	7
Advanced	7	0	1	6
Total	36	13	10	13

Dr. Sproule, in referring to his last report, states :—

"It is demonstrated by the foregoing report that the open-air treatment for the first few months is chiefly experimental, and that a long stay is necessary to affect any lasting good ; also, that unless the disease is treated in the early stages, but little likelihood of permanent cure can be expected. This makes it impossible for the poor to take advantage of the institution without the assistance of their friends."

After Results.

In April, 1907, Dr. Sproule in sending me the figures furnished below expresses regret at their incompleteness and suggests that probably many of those "unaccounted for" are as a matter of fact dead.

He adds, and it is important to note the fact before drawing inferences from the figures, that the chief feature of the inmates of this sanatorium is that they are very poor—just short of being paupers. These patients do not, Dr. Sproule states, relinquish work early enough, and when they do come to the sanatorium they can only afford a limited expenditure of time and money. They can consequently only stay a few months, and on being discharged they are compelled by the necessities of the situation to return to some kind of work at once, unless, that is to say, they are absolutely unable to do any work.

As an example of the advanced cases which find their way into this institution he cites the case of a boy aged 16, a Lancashire cotton mill "spinner" who had himself been well aware for a full year that he was suffering from pulmonary tuberculosis, but who still continued at his daily work.

Table showing after-history as ascertained on December 31st, 1906, of all patients discharged from the sanatorium up to the

end of 1905, and who had therefore left the institution for at least one year :—

Year of Discharge.	Stage when Admitted.	Improvement Maintained.	Worse.	Dead.	Unaccounted for.
1902 ...	Early... .. 11	4	—	2	5
	Moderately advanced 21	1	—	19	1
	Advanced 14	0	—	12	2
	46	5	—	33	8
1903 ...	Early... .. 12	4	—	4	4
	Moderately advanced 32	1	1	24	6
	Advanced 12	—	—	9	3
	56	5	1	37	13
1904 ...	Early... .. 9	4	—	4	1
	Moderately advanced 28	2	1	11	14
	Advanced 8	—	1	2	5
	45	6	2	17	20
1905 ...	Early... .. 11	4	—	5	2
	Moderately advanced 17	3	2	4	8
	Advanced 8	—	—	7	1
	36	7	2	16	11
1902-1905	Early... .. 43	16	—	15	12
	Moderately advanced 98	7	4	58	29
	Advanced 42	—	1	30	11
	183	23	5	103	52

These after-results are certainly, as Dr. Sproule points out, very disappointing when it is apprehended that of 183 cases discharged between 1902 and 1905 only 23 or 12·6 per cent. had maintained their improvement, while the remaining 160 were either “worse,” “dead,” or “unaccounted for.”

As regards the latter group it is of course probable, as Dr. Sproule suggests, that a large proportion are already dead, but it is possible that some may be at other sanatoria or at hospitals, or too depressed with their physical or social circumstances to fill up the inquiry forms sent to them.

CHAPTER II.

THE SELECTION OF A SANATORIUM SITE.

Increasing difficulties are no doubt being experienced in this country in the acquirement of sites for sanatoria, a fact which is mainly due to a disproportionate fear of infection which the public is by way of entertaining. It would, however, be difficult to support by satisfactory evidence the proposition that a sanatorium or other institution for the tuberculous sick, has, even when in juxtaposition with dwellings, led to increase in the death-rate from pulmonary tuberculosis among the population. On the contrary, there is abundant evidence that the phthisis death-rate has diminished amongst the population of places comprising sanatoria. In dealing with statistics relative to this question it is of course necessary to eliminate from among the total phthisis deaths those of persons who have come as patients to the locality.

In searching for a sanatorium site there are many considerations which have to be borne in mind, but it is perhaps possible to attach undue importance to some of them. A site must be considered in its general aspects; it is not to be rejected because it fails to fulfil all the ideals which at one or another period have been regarded as desirable.

The extension of the demand for sanatoria and the erection of these establishments on sites of very varying attributes has led to material modification in original notions upon the subject, and it would not be easy to show in so far at least as this country is concerned that the results obtained in one sanatorium as compared with another have had any intimate concern with the "suitability" of the site. Nevertheless there are certain general principles which should be held in view, although the fact should never be lost sight of that the main considerations as regards the successful treatment of pulmonary tuberculosis is to take the patient away from the environment in which he developed the disease, and to place him under conditions where he may obtain a sufficiency of good food, rest, and fresh air, and where his life may, for a sufficiently long period be ordered for him under the almost constant supervision of an experienced physician and disciplinarian.

Moreover, as Ransome has observed, "mere climate is of little importance in itself in the situation of a sanatorium provided it be not too hot or damp,"* and there is considerable force in the contention of Leon Petit that "the best climate is that which restricts least the daily duration of the stay in the open air."

* "The principles of open-air treatment of Phthisis and of Sanatorium Construction," by Arthur Ransome, M.D., F.R.C.P., F.R.S.

General Circumstances of Site.

Perhaps among the most important desiderata in the selection of a sanatorium site is the element of cheerfulness, a consideration which has not always been accorded due weight. One of the best methods of securing such cheerfulness is by means of some elevation of the site itself above the immediately surrounding country. It does not follow from this that anything approaching high altitude need be selected; indeed, in this country such altitudes are obviously impracticable. It has, however, been abundantly shewn that satisfactory results may be secured in institutions which are but little raised above Ordnance Datum. The point, however, which it is now sought to emphasise is the desirability of some elevation of the sanatorium site in relation to the immediate environment, elevation in such a degree as to afford a cheerful and inspiring prospect from the patients' rooms and from the grounds of the establishment.

There are certain institutions, some in this and some in other countries, which except for absence of relative elevation are thoroughly satisfactory establishments, but where the flatness of the site and of the surrounding country, together with the belt of trees which encircles the institution, conduce to feelings of limitation and depression among the inmates.

As Dr. F. J. Wethered points out in his prize essay,* in a wooded country the sanatorium should be at such a level as to overlook the trees.

Another point of importance in facilitating graduated exercise of patients is the selection of a site in an undulating country, where walks of differing gradation can be arranged. As regards aspect, it is generally held that a southern one is preferable, and as a matter of fact the tendency at the present moment is to erect buildings facing either S.S.W. or S.S.E. In many cases sanatoria comprise a central portion and two wings, these latter facing S.S.W. and S.S.E. respectively, an arrangement which, as Latham and West point out in their prize essay, has the advantage of, in some degree, protecting the rooms from the north and north-east winds.

A general southern aspect for a sanatorium, as also protection from the colder winds, may be best secured by erection of the building upon the slope of a hill facing southwards, the higher ground in the rear affording shelter from the north and east. But in search of shelter in this sense some institutions have gone to the undesirable extreme of adopting a site where stagnant air and stuffiness are difficult to avoid, and where dampness is promoted.

* Essay for the Erection of a Sanatorium in England for the Treatment of Tuberculosis, by F. J. Wethered, M.D., F.R.C.P., Lond.—“Lancet,” January 3rd, 1903.

Where the elevation of the ground behind and at the sides of a sanatorium is not regarded as affording adequate protection from the winds, a very material substitute for or addition to such shelter may be secured by a belt of trees. But such trees should never be placed very near to the sanatorium, nor should they be allowed to interfere unduly with the access of sun, air and light to the institution. Pine trees are regarded with great favour by many authorities, and a specific value is sometimes attached to their emanations. Whatever the value of pine trees is in the above sense, there can be no doubt that soils upon which pine trees flourish are, as a rule, well suited for sanatorium sites; as a matter of fact a large number of sanatoria, both in this and other countries, are situate in the neighbourhood of pine trees. Dr. Theodore Williams considers that localities covered with heather and short grass are generally suitable, and that those in which rank grass prevails should be avoided.

As regards the geology of sites no definite rules can be formulated, nor can it be affirmed that, of necessity, a permeable is better than an impermeable soil formation. Much must depend upon local circumstances.

A permeable subsoil filling up a hollow in a basin of impermeable rock is undesirable. A permeable soil on a slope not liable to pollution by sewage is preferable. A clay soil, owing to its moisture retaining properties, its coldness, and its tendency to crack, is not desirable; on the other hand, a hard impervious rock, such as granite, slate, or limestone, is satisfactory by reason of its impermeability and the ease with which, if on a slope, water runs off the surface.

Dryness of soil is a feature of great importance, and in the case of a projected site on a permeable formation it will be well to make trial holes with the view of ascertaining the level and fluctuations of the soil-water, or to attain like end by observing fluctuations of level in neighbouring wells. A high level of subsoil water is bad, a low level good, but great and frequent variations in the level of a subsoil water are regarded generally as unwholesome.

It would be well, too, if practicable to secure data as to the amount of rainfall and the number of hours of sunshine.

No general law can be laid down as regards the suitability of a given site for all sorts and conditions of patients. It is a matter of common experience that different people re-act in very different fashion to certain climatic conditions, and to send a patient to a climate which experience has taught him is relaxing, would be to deprive him of his full opportunities for improvement. In other words, in the selection of a sanatorium for the individual the "personal equation" of the patient must be held in view. Certain patients will doubtless profit in a high degree from sojourn in a high altitude, whereas others will be rendered worse; and the inference from these undoubted facts is that if one sanatorium fails to benefit a patient he should be advised to

try another in regard of which different climatic conditions prevail.

As to the desirability of exceptionally high altitudes such as obtain in certain sanatoria in Switzerland and Germany, it should be borne in mind that selection of high altitude owed its origin to what was in part a misconception as to the causation of phthisis. It was believed by Kuchenmeister that no phthisis occurred in persons living habitually above a certain altitude, and Brehmer, who embraced this belief, offered as an explanation the theory that the diminished air pressure at high altitudes so stimulated and fortified the cardiac muscles as to induce greater resistance to the disease. Brehmer's inference was that the best method of attacking the disease was to place the patient under conditions which would closely correspond to those enjoyed by persons living at high altitudes. Dettweiler, however, showed that persons living at high altitudes are by no means exempt from phthisis, and that the disease is found in even the High Alps.

No doubt the greatest care in the selection of a sanatorium has to be exercised in the case of patients suffering from advanced stages of the disease, but with those in the early phases of the malady, as Dr. Arthur Latham has stated "any climate will do for the treatment of tuberculosis, provided that the air is pure and bracing."

It may, however, be well to add, that an exposed "sea front" is not now regarded by some authorities as a desirable locality of residence for patients suffering from at all pronounced pulmonary tuberculosis, although excellent results, both in this country and abroad have during many years been obtained at sea-side resorts, sometimes indeed absolutely on the sea-front and on the sea-beach, with cases of tuberculous glandular and joint diseases. The long records of Margate, and Berck-sur-Mer on the coast of Normandy, bear sufficient evidence to this fact, and the coast of France at the present time abounds with institutions for the treatment of children suffering from tuberculous glands and joints, or from conditions which are regarded as "pre-tuberculous."

Pure air is no doubt a consideration of the greatest importance, but it is well to bear in mind that Dr. Noel Bardswell obtained some satisfactory results in the murky atmosphere in which the Sheffield Royal Infirmary is usually enveloped, and Dr. Niven has drawn attention to the satisfactory progress which even advanced cases make when under the conditions of atmosphere in Manchester.

Freedom from Irritating Dust Particles.

The evil influence of brittle dust particles in promoting the susceptibility to pulmonary tuberculosis is a matter which has already been dealt with in Chapter IV. of Part I. The pro-

clivity to "phthisis" of the Sheffield grinders and the Cornish rock drillers (tin miners) is well known, as is also the fact that less irritant particles such as coal dust and vegetable dust do not appear to be prejudicial. It is well, therefore, to avoid in selecting sites localities liable to become invaded by dust of a hard irritating nature, sites, for instance, in the proximity of sand dunes or sand wastes or of high roads. There is no doubt that the undesirableness of proximity to high roads has recently become enhanced by the development of motor traffic.

Abundance of grass land in the vicinity of a sanatorium is, as Dr. Wethered has observed, desirable, especially on soils which are easily dried and scattered as dust. Dr. Rufenacht Walters regards chalk sites as prone to promote dust unless they are covered with a sufficiency of surface soil and grass.

Size of Site.

The area of the site ranges in this country from a space barely sufficient for erection of the necessary buildings to several hundred acres, and no useful purpose can be served by attempting to lay down any regular standard. Obviously the area must depend upon the money and upon land available, the number and class of the patients, and the position of the sanatorium; while another consideration which cannot be altogether disregarded is local opinion and prejudice. Efforts have been made, and are being made, to require in regard of a site for a sanatorium conditions such as are prescribed for a small-pox hospital, *i.e.*, to confine the patients to an institution until they are either quite cured or dead. Such demand is altogether unreasonable and unnecessary. Where a sanatorium is situated in a sparsely populated rural area a site of relatively small dimensions is adequate, as there are abundant opportunities for the exercise of patients in the surrounding district; but even in cases of this nature it is desirable to provide in connection with the sanatorium a sufficient area of garden to enable the more weakly patients to take short walks under direct supervision, and in which "shelters" may be erected.

When a sanatorium is situated near a thickly populated urban district, local prejudice will not improbably demand that the patients shall for the most part be confined entirely to the grounds of the sanatorium, in which case a very considerable area may be requisite in order to provide the necessary walks, &c. It has, however, to be noted that the growing and desirable practice of encouraging work among the convalescent patients is rendering it almost essential that there shall be a considerable amount of land in connection with each institution.

Accessibility of the site is not such an important matter as might at first appear, as it is not generally considered desirable to encourage visitors. Moreover, if there be a station within a mile or two of the site patients can easily reach the

sanatorium from considerable distances and without undue fatigue, in a comparatively short time. There are obvious advantages in the site of a sanatorium being some two or three miles from a town or village, as the temptation of the public-houses and other attractions is apt to prove too strong for patients of weak will-power.

Telegraphic and telephonic communication with the nearest town or telegraph office is desirable in view of need for summoning friends in cases of emergency, and one or other of these systems is often useful in allaying the anxiety of nervous friends without the expense and ordeal of a visit.

Facilities for Sewage Disposal.

Given suitable conditions of soil the disposal of the excreta proper by means of a well-devised and carefully administered system of earth closets need not be a matter of great difficulty; but it has always to be borne in mind that in institutions of this nature, more especially where hydro-therapy may be an important element in the treatment, an abundant supply of water is necessary, and that a large amount of waste water may therefore have to be disposed of.

It is consequently desirable in the larger institutions to adopt a water-carriage system of some description, and in such cases the provision of a sufficient area of land to enable the sewage or slop water to be disposed of without nuisance becomes necessary. The introduction of biological methods of sewage disposal has no doubt enabled sewage to be sufficiently purified upon an area of ground much smaller than was hitherto the case, but septic tanks and bacterial filters must be at a sufficient distance from the sanatorium and from the frequented portions of the grounds to obviate particular nuisance to the patients on quite still nights or under conditions of wind. As regards certain sanatoria occasional nuisances have arisen although the bacterial plant is at some distance from the buildings; at times this nuisance is promoted by the lack of proper control over the plant.

Sometimes it is quite practicable and in the end cheaper where there is a neighbouring sewerage system to connect the sanatorium with it, but in remote rural districts the proximity of such a system is an unlikely contingency.

Water Supply.

An abundant supply of wholesome and relatively soft water, free from all risks of contamination, is a consideration of great importance in connection with any institution, and scarcity of such a supply commonly leads to neglect of cleanliness in every direction. Some sites have, it is to be feared, been acquired and sanatoria erected thereon without so full a regard to this point

as could have been wished, and with a result that scarcity of water has soon made itself inconveniently apparent. A study of the locality by aid of Ordnance Survey geological maps will afford great help in arriving at a conclusion as to whether springs or wells are likely to be found in the vicinity, and by such study some idea may be obtained as to the cost of a scheme of water supply. Where a spring is in question it is desirable to ascertain the amount of its flow, whether by observation or local enquiry, over all periods of the year and especially if possible during very dry years. It may sometimes be found that although there are no water mains near, the area is nevertheless within the statutory limits of supply of some water company, and the practicability of arrangements with such company for the laying of a pipe from their nearest main should be considered.

The following details as regards approximate area and elevation in respect of certain sanatorium sites in this country may be useful, but it should be pointed out that in some cases part only of the site is at present utilised.

Sanatorium.	Area of Site	Eleva- tion.	Sanatorium.	Area of Site.	Eleva- tion.
	Acres.	Feet.		Acres.	Feet.
Daneswood ...	3	400	Frimley ...	20	400
Pinewood ...	82	220	King Edward VII...	150	630
Croesley ...	66	480	West Wales ...	13½	850
Cumberland ...	40	900	Westmorland ...	4	110
Durham ...	2½	200	Winsley ...	46	400
Benenden ...	252	200-252	Worcestershire ...	30	310
Northumberland ...	10	650	Bradford ...	7	930
Maitland Cottage...	8½	375			

CHAPTER III.

SOME GENERAL CONDITIONS AS REGARDS SANATORIUM BUILDINGS.

It is not proposed in this chapter to discuss in detail the construction of sanatorium buildings, or to attempt to lay down any standards for observance in the erection of these institutions.

One of the effects of standards is to limit initiative and thus to hamper the evolutionary forces which may be trusted in the end to lead to the erection of the buildings, adapted to meet the requirements of the consumptive poor, and no one conversant with the subject can claim that an ideal and economic sanatorium has as yet been devised. This chapter is intended rather to encourage experiments than to set down standards.

In Chapter I. of this Part there will have been found an account of a large number of existing sanatoria together with, in many instances, photographs or plans of these institutions, and from those it will have been gathered that there is very great diversity in the character of the buildings at present utilised as sanatoria. It may be said in fact that the buildings range from huts to establishments of considerable complexity and costliness, and it would be difficult, in so far as the immediate or after-results of the treatment are concerned, to claim preference for one type over another, more especially when the class distinctions of the several groups of patients occupying the several institutions are allowed due weight. In the huts the elements of comfort and luxury have been relegated to a secondary position; the main factors of rest, fresh air, food and discipline have alone been considered. In the case of the more elaborate establishments, it will probably be correct to say that all the factors have been accorded full consideration.

In the former case the element of cost has been a very material, perhaps the most important factor; in the second case, expense has been a relatively secondary consideration.

The more elaborate establishments in this country are due to the munificence of philanthropists, who are entitled to the gratitude both of the phthisical and non-phthisical public. The less costly establishments have likewise in minor degree been the outcome of the liberality of the less well-to-do classes, or of a local philanthropy, where the means available have often rendered it extremely difficult, requiring the expenditure of considerable time and energy, to collect the necessary funds even to provide a small number of beds on the least extravagant lines,

The outcome of the combined philanthropy of the wealthy and the less well-to-do has been as yet only to provide a limited number of beds, and the question which seems to call for consideration in a utilitarian and economic aspect is what is the minimum expenditure which will serve to provide, for those who cannot provide them for themselves, the *essentials* of sanatorium treatment? Obviously, the smaller the cost the greater will be the number of consumptive patients who for a given sum can be accorded the advantages of sanatorium treatment; and from a purely economical standpoint, as well as from a humanitarian point of view, this is the object to be aimed at. For the most part consumption is a disease of the poorer classes, who in the ordinary routine of their lives have not in the past been accustomed to anything approaching the luxuries of existence. Hence, they are not likely at a sanatorium to miss things of which they have had practically no experience. It is otherwise with the well-to-do; but as they are able to obtain treatment at private sanatoria and are competent to promote and protect their own interests in this matter, it is not necessary in this report to consider this class.

What may be regarded as the essentials of open-air treatment are: (a) rest, (b) fresh and pure air, (c) sufficiency of suitable food, and (d) constant medical supervision, with adequate opportunities for carrying out the treatment prescribed. With the view, therefore, of arriving at some general idea as to the cost of the essentials of sanatorium treatment, it may be useful to briefly consider certain specific instances where economy has been an essential condition of the provision of the sanatorium, and the usual standard of the cost per bed may be adopted in the examination. It has, however, to be stated that it is only possible to arrive at a somewhat general idea as to the cost per bed, and this for a variety of reasons.

In some cases the cost of the site is included, in others it is omitted, while in other cases it is difficult to assess the value of the site because it has been given by a local landowner (Nottingham), or leased at a nominal rental (West Wales, Leeds).

Moreover, it has always to be borne in mind that where the number of beds is relatively small the cost per bed will be correspondingly great, seeing that in any case it is necessary to provide some form of administrative block, lighting, warming, water supply, drainage, &c., whereas at a little extra cost additional accommodation for patients may be provided, which will serve to diminish materially the average cost per bed. Illustrations of this point are furnished later in this chapter, but it is necessary to bear in mind that reduction in cost per bed by the addition of shelters, &c., cannot be carried to an indefinite extent, since a point is sooner or later reached where an increase in the number of beds involves additions to the administrative accommodation, if not an increase in the size of the site.

There are, too, numerous other factors which must be borne in mind in considerations relative to cost per bed, and among these may be mentioned the accessibility of the site as affecting the cost of cartage of materials, the proximity or otherwise of brickfields or stone quarries, railway stations, &c. For example, in the case of certain sanatoria (Winsley and West Wales) suitable stone has been found on the site. In some cases, too, there has been in the first instance no erection of an actually new building, but the adaptation of existing houses or institutions to the needs of a sanatorium (Westmorland, Durham, Leeds, Devon and Cornwall, Daneswood), while in other cases an already existing house has served, and in some cases still serves, as an administrative block (Worcester, Kelling).

Another matter materially influencing the cost per bed is the provision or non-provision of a separate bedroom for each patient.

By some authorities upon the subject such provision is considered almost essential, as affording better opportunities for the necessary rest and quietude than can be provided in what may be termed common dormitories. It is also urged that the coughing of certain patients is likely to disturb the rest of others, and that the presence of bed-ridden patients creates a depressing influence upon those who are in a fair way towards recovery. It may, perhaps, be accepted that a separate bedroom is desirable where economy is a minor object, and that in any case there should be a certain amount of separate accommodation available for cases obviously requiring it. But seeing that this separate provision materially augments the cost per bed, and also tends to increase the administrative expenses, with the result that fewer consumptive patients can be afforded sanatorium treatment, it is a matter for serious consideration whether the separate bedroom can be regarded as an essential element in sanatorium treatment. In any case it may be well that the promoters of a sanatorium should take into consideration the fact that separate bedrooms are not, as a matter of routine, provided at the following sanatoria:—Durham, Westmorland, Crossley, Leeds, Devon and Cornwall, Heswall, Northwood, Maitland Cottage, Coppin's Green, Nottingham, and others. The results, as regards immediate and after-results, obtained at these institutions can, in the majority of cases, be ascertained by a reference to Chapter I. of this section.

The provision of a certain number of separate bedrooms in proportion to the class of cases admitted is no doubt desirable, and even essential, but this is in no sense the same thing as the general provision of such bedrooms. Moreover, a very considerable degree of privacy can be secured by the provision of the form of cubicle provided at some of the least costly sanatoria, such as Kelling and Maltings Farm, and by the

erection of wards to accommodate two, four or six patients each, a differentiation of patients may be effected which goes far to diminish the need for the general provision of separate bedrooms.

The cubic space per bed is another factor which materially influences the cost. Endeavour has sometimes been made to secure a minimum provision of some 2,000 cubic space per bed; indeed, in one institution it was proposed to insist upon a minimum of 4,000. It is well, however to remember that the conditions obtaining at a sanatorium, conceived and erected with a proper regard to the open-air treatment, are essentially different from those obtaining in an isolation hospital for the acute exanthemata, or in a general hospital. At a sanatorium efforts are made to secure by open windows, or no windows at all, an abundant supply of fresh air; and in the case of shelters, wherein it is claimed by some that the best results of all are secured, the cubic space is practically unlimited, the bed being surrounded on all sides by the open air. It is, therefore, not desirable, or in the interest of the general provision of sanatoria, that too high a standard of actual cubic space should be aimed at. Each case must be considered on its merits, and when an ordinary dwelling-house is used with no adaptations for securing a proper supply of fresh air, a high standard of cubic space should be insisted upon.

The approximate cubic space per bed at certain sanatoria in this country is as follows :—

Sanatorium.	Cubic feet per bed.	Sanatorium.	Cubic feet per bed.
Daneswood	1,700	Kelling	500*
Pinewood	1,200	Northumberland ...	1,600
Heswall	1,000	Frimley	1,300
Crossley	1,800	King Edward VII.	1,750
Cumberland	500-1,300	West Wales	1,500
Devon	900	Westmorland	500-900
National Sanatorium, Ventnor.	1,200-1,800	Winsley	1,500
Benenden	720-1,200	Worcestershire ...	800
Northwood	1,400	Bradford	1,200

* The beds at this institution are in cubicles to which abundance of air has access.

As regards structure it is sometimes urged against wooden buildings that an impermeable surface cannot easily be secured, but it will be seen by a perusal of the accounts furnished of the several sanatoria in Chapter I. of this Section, that there are at the present day numerous economical devices for securing impermeable and easily washable surfaces,

A further objection to wooden buildings is their inflammability, but in the case of one-storied buildings for early cases of pulmonary tuberculosis this objection has not the same force as in the case of two-storied buildings where bed-ridden patients may be in question. Moreover, there are now many fire-proof applications which can be employed, as also many cheap substitutes for wood.

In dealing with the character of sanatoria actually in existence, illustrations may in the first place be furnished of what are known as "temporary" buildings, *i.e.*, buildings constructed not of brick or of stone, but of wood, corrugated iron, or some patent preparation of somewhat similar character, and generally regarded as less substantial and less permanent than stone or brick.

The Kelling Sanatorium may be quoted as an instructive example of such "temporary" buildings, since, at any rate, in a considerable part of this institution there has been given what is perhaps a minimum of shelter in ordinary weather. In times of heavy storm, however, the patients, while in their beds, can be adequately protected against wind and rain without at the same time depriving them of an abundance of fresh air.

It will be seen that the inclusive cost per bed at this institution works out at about £200, but additional beds for females have been provided at a much smaller cost. (See page 431, Part II.)

Another institution where economy in construction has been carefully observed is at Maltings Farm Sanatorium at Nayland in Suffolk, an account of which will be found at page 462 of this Part.

Here, as at Kelling, the sanatorium had its beginning in an adapted farmhouse, wooden bungalows having been subsequently erected, a large barn converted into a dining-hall, and other farm buildings utilised, after alteration, as kitchen offices.

The most recently constructed portion of this institution—that for females—of which an illustration will be found in Chapter I., Part II., page 464, was erected at a cost of £110 per bed, including a proportional share in the conversion of the barn and other farm buildings. The cost of the site is not, however, included, as such site is rented from the East Anglian Sanatorium Company.

The Cumberland Sanatorium is a "temporary" structure, consisting of "wire-wove" material and matchboarding. (See page 358, Part II.) In this case a larger area of site than was actually necessary had to be purchased, and the existing building, with the land upon which it stands, cost £6,000, *i.e.*, £300 per bed for 20 beds; but, as will be seen by the description furnished of this sanatorium, as sleeping shelters can be erected for

£20 each, a total of 40 beds could be provided at a total average cost of £165 per bed.

If the cost of the existing buildings and of the whole site be included and 20 more beds be added at an outlay of £600, the cost per bed would amount to £240.

That portion of the site which is not required is let at a rental of £45.

The Nottingham Sanatorium is another instance of a temporary building consisting of a wooden structure erected upon brick foundations and having a galvanised iron roof. (See page 450, Part II.)

The initial cost per bed, exclusive of the cost of the site, worked out at about £220, but additional beds have since been added, with the result that the average cost per bed has been materially reduced.

At Maitland Cottage Sanatorium, which is a wooden building with a tiled roof, the cost per bed for 18 beds was £205 inclusive of the site, and £150 exclusive of the site. (See page 456, Part II.)

The most recently opened temporary building is the Barrasford Sanatorium near Newcastle-upon-Tyne. (See page 447, Part II.)

This institution is constructed of wood and corrugated iron, the foundations, chimney stacks, and boiler-house alone being of stone. Over the inner lining of the walls is a covering of "Uralite," a material which affords a smooth fire-proof surface and affords facilities for cleansing and disinfecting. It is estimated that when the sanatorium for 100 beds is completed the cost per bed, inclusive of the site, will prove to be about £270.

As regards Poor Law sanatoria the Bradford Sanatorium may be quoted, since this is the only "temporary" structure which has so far been erected by expenditure sanctioned by the Local Government Board. In this case, however, the administration block is a permanent structure of stone, the sanatorium pavilion, providing accommodation for 26 patients, being of wood. The total cost per bed at this sanatorium, including the cost of a site of seven acres but excluding the provision of a laundry and porter's lodge, was about £230.

Midway between what may, for purposes of description, be regarded as "temporary" and "permanent" building is the Benenden Sanatorium, the first institution promoted by the "National Association for the Erection of Sanatoria."

The construction of this institution is quite unique in so far as sanatoria are concerned, the material consisting of hollow terra-cotta blocks known as "Frazzi" ware. These blocks are supported by iron stanchions at intervals. (See page 394, Part II.)

The advantages claimed for this material are that it is cheap, light, durable and fire-proof. Moreover, buildings constructed of it can be very rapidly erected and, owing to the short time necessary for drying, they can be occupied almost immediately after completion. It is contemplated that the cost per bed, exclusive of that of the site, will amount to about £100.

In a paper read before the London Architectural Association in the spring of 1907, Mr. Edwin Hall exhibited designs for the construction of sanatoria at a cost, exclusive of the site, of from £85 to £105 per bed, such cost to include the necessary administrative building but to exclude that of the site, the procuring of water or the treatment of sewage; it includes, however, the cost of water storage.

The proposal, as I understand it, is to construct these sanatoria in units of eight beds each, each unit containing six wards with single beds and one with two beds.

The cost of what are termed, for descriptive purposes, "permanent" buildings is materially in excess of that necessitated in the case of "temporary" buildings although, perhaps, the difference is not so great as is believed by some persons, more especially when the expenses of the necessary repairs and reconstruction is taken into account.

One of the less costly of these permanent buildings is the Heswall Sanatorium, a Poor Law institution erected by the three Boards of Guardians of the city of Liverpool upon a site of 15 acres, and affording accommodation for 24 patients. (See page 277, Part II.)

The total cost per bed, inclusive of the cost of the site, was £500, exclusive of the site, £338.

Two permanent establishments where, in each instance, the stone out of which they were erected was quarried on the site itself, are Winsley and West Wales.

In the first case, that of Winsley, where a freehold site of 46 acres was purchased for £1,716 17s. 4d., the total cost per bed for the accommodation of 66 patients would appear, from the figures furnished in the report for 1904-5, to be about £682. (See page 516, Part II.)

In the case of the West Wales Sanatorium, where the site is leased at a small rental, the cost per bed will apparently work out at about £400. (See page 487.)

The precise cost of the most elaborate institutions in this country cannot be given because they were provided by the munificence of private donors, but it is believed that the cost of establishments such as the King Edward VII., Crossley, and Northwood sanatoria has been approximately £1,000 per bed.

It seems clear from the foregoing references that with foresight and care the erection of sanatoria embodying all the actual essentials of open-air treatment might be provided at a materially smaller cost than has hitherto always been the case.

In the case of local authorities or other public bodies contemplating the erection of sanatoria it would be well that some of the different types of building described in this Section of the report should be visited, and a careful enquiry made as to the class of patients admitted, the methods of selection adopted and the results—especially the remote after-results—of treatment investigated. In this way a considerable saving in cost may probably be made, and the best results which are to be obtained under existing conditions secured.

PART III.

This Section relates solely to considerations as to the important question of the Notification of Pulmonary Tuberculosis and, as it may possibly be found convenient to issue this Section of the report in separate form, it has been thought desirable to refer briefly to certain points which have already been touched upon in Part I.

CHAPTER I.

GENERAL CONSIDERATIONS AS REGARDS THE NOTIFICATION
OF PULMONARY TUBERCULOSIS.

If what may be termed the "standard" of the highly infectious diseases, such as small-pox, diphtheria, and scarlet fever, be applied to so chronic and slightly communicable a malady as pulmonary tuberculosis, there are obviously many pleas which may be adduced in favour of its notification. For instance, upon such basis of consideration it may not unreasonably be contended that in absence of knowledge as to the prevalence and whereabouts of cases of this disease active preventive measures such as education, disinfection, and, perhaps, isolation, are not practicable, and that a study of the distribution of the disease in any given locality cannot usefully be undertaken.

But at the outset of a discussion on a question of such scientific and administrative importance as this, it may be well to bear in mind the teachings of experience. Measles notification has not yielded the results which were at one time anticipated, possibly owing to the fact that the disease is infectious before it is recognised: and even in the case of scarlatina, a disease that is compulsorily notifiable throughout the country, and in regard of which, especially in our large towns, notification has been followed by a very general system of isolation, disinfection, &c., it is sometimes difficult to demonstrate statistically the satisfactory results of such combined measures. This latter fact is regarded by many epidemiologists as due to the circumstance that owing to the prevalence of unrecognised and perhaps "carrier" cases a large number of patients who are potentially infectious are not brought under any control at all; and further there is the suggestion that in at least some instances where hospital isolation has been uniformly employed the major opportunities for the spread of infection in the invaded household had occurred before the disease had been recognised and the patient isolated. In a sense scarlatina has obvious analogies with tuberculosis, seeing that a large number of cases are unrecognised; but there is the notable difference that a person suffering from this latter disease may, unlike the scarlatina patient, live "uncured" for many years.

It has already been shown in Chapters I. and III. of Part I., that tuberculosis differs very materially, both as regards its character and its degree of communicability, from the acute diseases of short duration to which reference has above been made; and it has been pointed out that large numbers of persons are found, when examined after death, to have suffered at some period of their lives from tuberculosis of some tissue or organ, such lesion

having often become healed though the malady has been neither recognised nor treated. In many such cases of lung tuberculosis the lesions were such that tubercle bacilli must have been freely voided with the sputum.

It has also been made clear that among cases of pulmonary tuberculosis which are *recognised* is included a considerable proportion of individuals who do not expectorate, and hence are of no danger to those persons or places with whom or with which they are associated.

Similarly, attention has been drawn to the fact that of persons developing phthisis to the stage of expectoration, large numbers become actually cured, or so far improved as to cease to be instrumental in spreading infection by means of their sputum; they have in effect ceased to expectorate.

In considering the subject of notification the above facts may usefully be held in view.

It is often contended, quite logically, that assuming consumption to be spread mainly, or even largely, by the agency of sputum, dissemination of the disease in this way might be substantially reduced if all persons who are suffering from the disease are brought to the knowledge of the sanitary authorities, and are educated by means of leaflets and by the visits of tactful persons how best to limit the risk associated with the careless disposal by them of their expectoration, as well as to take all such steps relative to the prevention and spread of their malady, as may be suggested by officials specially instructed in the work.

Precautions such as these are certainly likely to limit the spread of the disease. But it seems not improbable, having regard to the belief as to the manner of spread which has gained almost general acceptance, that wherever there is an individual who is the subject of "open" pulmonary tuberculosis *some* risk, precautions notwithstanding, may be incurred by persons associated with him, and it would be helpful if in considering restrictive measures there was some means by which this "residual" risk could be gauged. In this connection it may be useful to recall certain points which have already been referred to in the earlier portion of this report.

Before the work of Flügge and his pupils taught that infection is likely to be spread largely by the droplets of mucus which are diffused by a person suffering from "open" consumption each time that he coughs, sneezes, or talks loudly, it was considered that if the sputum which he voluntarily expectorates was received into a flask or other suitable receptacle containing some efficient disinfectant, and if his lips and moustache were carefully wiped after the act of expectoration, all danger to other persons could practically be avoided. On what may be termed the dust-borne thesis, it is believed that one of the greatest risks of spread of phthisis is due to the drying of the expectorated tuberculous

matter and its retention along with dust in the ill-lighted, ill-ventilated, and overcrowded dwellings of the poor, *i.e.*, in places wherein the sun's rays fail to exert their bactericidal properties.

Some recent observations,* which point to the conclusion that freshly voided sputum tends rapidly to lose its infecting qualities, may, if confirmed and afforded their proper weight, tend somewhat to modify current notions. These negative observations, together with the work of Flügge and his pupils, may be held by some persons to suggest that the greatest risk is possibly incurred when a susceptible person comes in contact with, or rather inhales, freshly voided droplets disseminated into the air by a subject of "open" tuberculosis during explosive expiratory efforts.

There would, indeed, seem grounds for expecting that the greatest pathogenic power of the tubercle bacillus may be possessed at the moment when it is separated from its living host wherein it has found a soil such as has enabled it to multiply and at the same time maintain its virulence.† In this connection, however, the question of dosage or number of bacilli has undoubtedly to be considered.

It is true that by certain precautions risk of infection in the above way by droplets may be very materially diminished; as, for instance, by holding a handkerchief before the mouth and nose in the act of sneezing, coughing, and loud speaking, or by following the suggestion (Flügge and Heymann) that the phthisical person when coughing or sneezing should place a distance of one metre (39 inches) between himself and persons associated with him.

But the question may arise whether precautions such as these can in practice have more than partial value as preventive measures, more especially when regard is had to the well-known experiments made by a lecturer who, washing out his mouth periodically with a solution of *Bacillus prodigiosus* (an organism which manifests in suitable media a red growth easily detectable), proceeded to lecture in an empty theatre over which were distributed numerous Petri dishes containing culture media. It was found that when the lecturer spoke quietly none of the plates showed signs of growth, but that when he spluttered or stammered, *i.e.*, became in any way impulsive in his utterances, the plates in most parts of the theatre became inoculated with *B. prodigiosus*.

The experiments made in this country by Dr. Gordon for the Local Government Board and more recently for H.M. Office of

* *Revue D'Hygiène et de Police Sanitaire*, Tome xxvii., No. 11, Novembre 20th, 1905. Sur la contagion de la Tuberculose par les voies respiratoires par M. le Dr. Cadéac, Professor à l'Ecole Veterinaire de Lyon.

† *Revue D'Hygiène et de Police Sanitaire*.

Works may also be consulted with profit.* This investigator was able to show that *Streptococcus brevis*, a micro-organism which he regards as being characteristic of saliva, was discovered after "oration" on culture plates placed as far as 40 feet from the speaker. All experimental work in the same direction would seem to raise the question as to the practicability of entirely arresting infection which is liable to be distributed with the saliva of a relatively active person, and if this doubt is well founded the further question arises as to whether it is probable that in cases where the infective power of a person may last for very many months, or even for years, the education of the patient and the periodical visits of an inspector are, beneficial as such visits doubtless are, likely to reduce the chances of infection to such a degree as to become statistically appreciable.

The foregoing considerations render it at least conceivable that the instruction and advice which is in certain districts given by the trained officers of the sanitary authority to persons who are suffering from consumption, may in the end be found to have exercised only a limited salutary effect. Experience may indeed subsequently indicate, as it has perhaps already suggested with respect to certain definitely acute infectious diseases, considerable difficulty in *demonstrating* the useful effect, which has been produced. It is, of course, here assumed that wherever phthisis notification is adopted, what may be termed the usual precautionary measures are taken. Where such notification is adopted solely for purposes of studying the distribution of the disease, or, as is to be feared is not infrequently the case, in order to bring one district nominally into line with another, no such effect can reasonably be anticipated.

Among "usual precautions" in addition to facilities for the examination of sputum and a general prohibition relative to promiscuous spitting may be included such measures as the repeated and frequent visits of trained inspectors to the house from which the phthisis patient is notified; the giving of the obviously necessary advice as to the importance of fresh air, rest and nutrition, and the supply of spitting flasks by the inspector; the use of destructible handkerchiefs or substitutes therefor during expulsive respiratory efforts; the setting aside, where practicable, of one room for the sole use of the patient; and the periodical cleansing and disinfection of the premises, together with the routine employment in the invaded house of wet "dusting" in place of dry "dusting."

Moreover, it is here assumed that whether the patient be a male or a female the inspector will enjoin the exercise by him or

* (a) Report of the Medical Officer of the Local Government Board, 1902-1903, Appendix B, No. 2, "Bacterial Test for Estimating Pollution of Air." By Dr. M. H. Gordon.

(b) House of Commons Ventilation. Appendix to Parliamentary Paper (Cd. 3035-1906). Report by Dr. M. H. Gordon on an investigation of the Ventilation of the Debating Chamber of the House of Commons. Wyman & Sons, Ltd., Fetter Lane, E.C. 1906.

her of the greatest care in any factory or workshop in which he may be employed. Logically, it would seem to be necessary to follow the patient to the workshop or factory and see that he or she is removed a full meter from other workers, or, better, that the patient should have a separate bench or room.

If notification of phthisis is to prove of substantial utility the above sketch indicates, it would seem, the minimum to be practised, and the question which has to be determined by experience is the amount by which such measures, if diligently persistently and generally applied, would be likely to diminish risks such as, upon the current beliefs, do in practice obtain?

There are as yet no data by which this question can be in any sense conclusively answered, and all that is at present practicable is to set out the facts, so far as they are available, for certain of the more important towns wherein phthisis notification has been adopted; to ascertain in regard of each town what proportion of the cases have been notified and to examine how far the steps taken as the result of the information received have increased the rate of the decline in the death-rate which had been in operation in many places before such measures were taken.

But assuming that phthisis notification is expedient, *i.e.*, that the advantages *quâ* the diminution of tuberculosis are likely to out-weigh any disadvantages to the public, the question arises: Should such notification be *voluntary* or should it be *compulsory*?

With regard to voluntary notification of phthisis the experience of England is, although the system has been fairly widely distributed, too short to enable any very trustworthy conclusions to be arrived at; and of compulsory notification our experience is still more limited, being confined to the towns of Sheffield and Bolton. As regards compulsory notification, however, there are some data from New York, which will be presently considered in detail.

Dealing first with this country, data are furnished for some of the most important places in which voluntary notification of phthisis has been adopted. These data afford in each instance, where the information is available, the annual number of phthisis notifications, the annual number of phthisis deaths, and, in the form of a chart, the death-rate from pulmonary tuberculosis per 10,000 of the population since 1881. The charts furnished in the next two chapters are for the purpose of enabling the reader to appreciate at a glance the *rate of decrease* of phthisis mortality which has obtained in the majority of instances dealt with prior to notification of the disease, and the rate which has obtained since notification was adopted and the measures resulting therefrom have been practised. *In the construction of these charts the nearest whole number has in all cases been taken, and where the actual rate was midway between two whole numbers, the lowest whole number has been selected.*

In examining these charts it has to be remembered that the introduction of voluntary notification, even with all the measures outlined above, is not likely forthwith to manifest itself upon the death-rate curve.*

One of the main objects of notification, as at present applied to tuberculosis, is to prevent persons in association with others who are suffering from the disease from contracting the malady, and, hence, those who had contracted it before steps consequent upon notification were taken are likely to swell the death returns during the next three years or more. After three years or so of notification it might, so far as can be judged from what is known of the disease, be expected that a reduction in the death-rate, *as a result of notification* and the consequent measures, would be apparent; that is to say, that the curve indicating the death-rate should after three years or so fall towards zero at a *greater rate* than it fell prior to notification, assuming, of course, that the forces which previously brought about the reduction are still acting with equal intensity, and that no new factors have to be considered.

But it is not perhaps quite clear whether the argument just adduced as to the length of time (three years) necessary for demonstrating the effect of notification and the consequent measures is altogether a sound one. It has to be borne in mind that a considerable number of consumptive persons die after a few months' illness, and that, consequently, if fewer people contracted this rapid form of consumption the number of deaths from this cause, other conditions remaining the same, should show some reduction within two years, assuming that the preventive measures taken have reduced the infective power of consumptive patients to such a degree as to enable certain persons predisposed to the disease to escape infection.

Although the great majority of the boroughs north of the Thames have adopted voluntary notification, data respecting them are not here dealt with. Until such notification is general throughout the Metropolis the statistics for the individual boroughs might prove misleading. They are, however, easily procurable by persons anxious to consider the Metropolitan aspect of the question.

* In the charts furnished in the next two chapters a space has been left for entry on them of rates for subsequent years in order that observers may be able to judge of the results of notification, and of measures taken in consequence of the information thus obtained, after lapse of a sufficient period.

CHAPTER II.

VOLUNTARY NOTIFICATION OF PULMONARY TUBERCULOSIS.

By the term voluntary notification is implied a system by which any medical practitioner attending a case of pulmonary tuberculosis is at liberty, and is indeed encouraged, to notify such case to the sanitary authority; the notifier receiving for such notification the fee of 2s. 6d. or 1s. according as to whether he notifies the case in his capacity as a general medical practitioner, a poor law medical officer or a medical officer of a public institution.

As a general rule there are no limitations attached to such notification, the medical practitioner being equally at liberty to notify quite early cases in which there is no breaking down of lung tissue and no expectoration, and cases which are practically in *extremis*; i.e., both *closed* and *open* cases are alike notifiable. By *closed* cases is understood cases of consolidation in which there is no breaking down and hence no expectoration bearing tubercle bacilli; by *open* cases is implied cases where cavitation has taken place and the expectoration contains the specific organism.

In certain towns, however, such, for instance, as Liverpool and Cardiff, the sanitary authority asks that only such phthisis cases shall be notified as are, in the opinion of the certifying practitioner, living under circumstances indicating that the advice of the sanitary department is likely to be of use. In other districts no fee is paid for cases notified shortly before death. In Brighton the notification of persons in *extremis* is discouraged.

A somewhat modified system of the voluntary notification of pulmonary tuberculosis has been introduced into the metropolitan borough of St. Pancras, and is referred to by Dr. John F. J. Sykes in his annual report for 1905. It is here proposed that the patient's assent shall be secured before notification, and no action is to be taken by the sanitary authority except on special written request. On the receipt of a notification certificate a leaflet of instructions is sent to the patient together with a list of sanatoria, homes, &c. for the accommodation of consumptive patients. A form is also enclosed which can be filled up in the event of disinfection of premises being desired. It is stated that nothing will be done to prejudice the patient's occupation or employment, and that no inspection of the premises will ensue on account of the notification unless a written request for such inspection is made.

No reference is made in the annual reports which have come under notice to any provision for removing from the list of

notified phthisis cases persons who have recovered from the disease; but Dr. Scurfield, of Sheffield, states that in that town a few names have been deleted for this reason.

The subjoined data relate to some of the more important towns in which a system of voluntary notification has been introduced and for which statistics relative to the behaviour of consumption since 1881 are available. Consideration is first given to Manchester, Brighton, Liverpool and Cardiff, because in each of these places voluntary notification has been in force for some six years, and certain measures are habitually taken in consequence of the information received.

Manchester.

(Estimated population in 1906, 637,520.)

Voluntary notification of phthisis came into operation in Manchester on September 1st, 1899, since which year the annual number of notifications has, according to successive reports of Dr. Niven, the medical officer of health, been as follows :—

Years.	Poor-law cases.	Institutions	Private Practitioners.	Total.	Deaths.
1900	578	455	510	1,573	1,133
1901	625	373	341	1,339	1,142
1902	667	305	303	1,275	1,145
1903	556	550	251	1,357	1,023
1904	512	440	250	1,202	1,106
1905	527	588	291	1,406	988
1906	565	510	304	1,379	1,039
Total...	4,030	3,221	2,280	9,531	7,626

It will be noticed that though in each year the number of notifications has exceeded the number of deaths, the number of cases notified year by year by medical practitioners steadily diminished, up to 1904 when it was smaller than in any of the four preceding years. In 1905 there was, however, a definite rise in the notifications under each head.

As regards the relations obtaining between the number of cases notified and the number of deaths, Dr. Niven observes in his annual report for 1902 :—

“ If one takes three years as the average duration of life after the onset of phthisis, then one would expect that after a scheme of notification had been existent for a few years the number of new cases arising would approximate more and more closely to the number of deaths. If all cases were notified (which is not so, seeing that of all deaths occurring from phthisis in Manchester only a little more than half that number occur among notified cases) then over a number of years the number by which the notification of new cases exceeded the number of deaths from phthisis would represent :—

“ 1. The number cured and the number mistakenly diagnosed as phthisis.

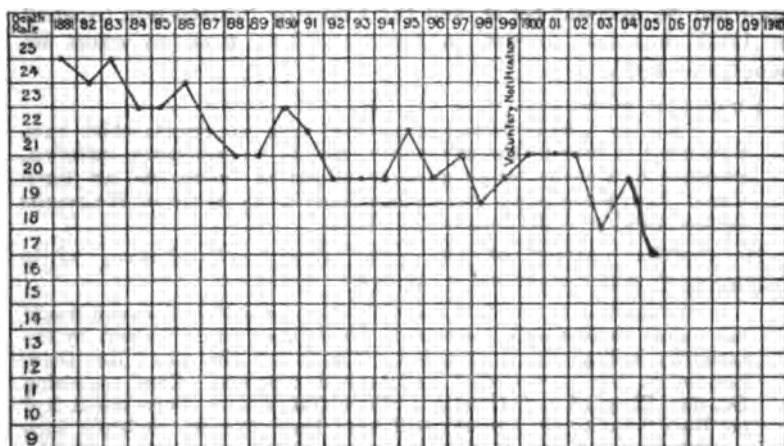
- " 2. The number notified who have left Manchester before death.
 " 3. The number of phthisis patients who were certified as dying from some other disease."

It will be observed that voluntary notification of phthisis has now been in operation in Manchester for a completed period of six years, and it is needless to add that in this city the greatest practical use is made of the information obtained. It should, however, be noted that the practice of notification did not come into full operation until 1901. It may be pointed out for the information of those interested in the subject that Dr. Niven's annual report for 1905 contains an admirable account of what was done in Oldham as regards the notification of phthisis as far back as 1892, and of the manner in which Dr. Niven himself had been hard at work in the matter of the prevention of pulmonary tuberculosis in Oldham even as early as 1886. (See also *Lancet*, 18th November, 1893.) Indeed, it is clear that the honour of initiating much of the preventive work now carried out in so many parts of this country in regard of phthisis belongs to Manchester and its neighbourhood, and, as Dr. Niven observes in the report above referred to :—

"The members of the Council should realise the long-continued effort of public men in this great centre of activity to deal with the problem of tuberculous disease even before the discovery of the tubercle bacillus by Koch in 1882, or the subsequent investigation of Cornet on house infection in 1886"

The following chart indicates the fall in the death-rate from consumption in Manchester prior and subsequent to the introduction of voluntary notification.

Death-rate from Pulmonary Tuberculosis in Manchester (per 10,000 population) from 1881-1905.



The death-rate for 1906 was 18.1 per 10,000.

In supplement to this chart it may be well to refer to certain observations made by Dr. Niven in his report for 1905. Reviewing the results of the enormous amount of labour which has been expended in Manchester in efforts to reduce the death-toll from consumption, he observes :—

“The death-rate from phthisis could not be expected to be much influenced by the working of the notification scheme prior to 1903 since it only entered into full operation in 1901, and the average duration of illness in the artisan class approaches three years.”

He then furnishes the following table, showing the death-rate per 10,000 (his table gives rates per 1,000) from pulmonary tuberculosis in Manchester for periods of three years from 1894 to 1905.

Year.	Death-rate.	Year.	Death-rate.	Year.	Death-rate.	Year.	Death-rate.
1894	19·7	1897	21·2	1900	20·9	1903	18·5
1895	21·6	1898	19·5	1901	20·9	1904	19·8
1896	20·0	1899	20·5	1902	20·8	1905	16·8
Averages	20·4		20·7		20·9		18·4

As regards 1905, Dr. Niven is careful to remind his readers that this was a favourable year for chest diseases generally, and in this connection it may be well to refer to other charts furnished in this section as also in Chapter XXI. But he adds that “it does really seem as if a step forward had been taken in the prevention of phthisis,” and he proceeds to consider, in the event of the fall of mortality from this disease being a real and permanent one, to what forces it may be attributed. It cannot, he thinks, be ascribed to hospital treatment, since no change has occurred to account for it, and the Crossley Sanatorium (opened in 1905) has not as yet, in his view, had time to exert its beneficial effect.

Finally he adds :—

“Nor do I know of any cause other than the efforts which have been made to instruct the community, and to remove house infection, adequate to account for so great an alteration during the last three years. Provisionally we may claim a considerable share in the results for the working of the notification scheme.”

In another portion of the same report Dr. Niven, while discussing further preventive measures, states :—

“It has been believed by many that a scheme of notification would fail unless there were a hospital to which cases might be sent by the authority dealing with notification. This is not the case. But there is more in this view than I had at first supposed. Even supposing Bordon Hospital and Hardman Street Out-patients Department had not been in existence, it would still have been advisable to begin with a notification scheme, so that the needs of the community might be ascertained, and much useful work would have been done in the way of instruction.

"But it has to be remembered that to sustain household visits month after month, perhaps for years, becomes rather trying, and demands great tact and management from the visitor, as well as judgment on the part of the person visited."

In his last annual report (1906) Dr. Niven observes :—

"One has been inclined to ascribe part of the recent reduction of the phthisis death-rate to the work done in connection with the voluntary notification of phthisis, more particularly because the fall in the death rate has occurred at a period when the effects of this work should be especially manifest. But there are clearly other favourable factors in operation of which by far the most important is the general advance in the wages of the labouring class."

The following table indicates some of the work carried out at Manchester in consequence of notification :—

—	1899.	1900.	1901.	1902.	1903.	1904.	1905.	1906.
Houses infected...	No record.	690	957	962	1,127	1,237	1,564	1,537
Specimens of sputum examined.	"	258	517	585	628	660	788	911
Cases reported as sent to hospital.	140	851	1,012	1,166	1,169	1,207	1,849	1,541

The above table indicates but a very small portion of the enormous amount of work in connection with tuberculosis which has been inaugurated by Dr. Niven, and which is carried on day by day in Manchester under the immediate superintendence of Mr. Lock. Dr. Niven was good enough to afford me the fullest opportunities of examining his methods and to furnish me with all the data available at the date of my visit. I have also had the opportunity of seeing an advance proof of his current annual report which has been of great assistance to me.

Brighton.

(Population, estimated, in 1906, 128,095.)

The experience of this borough as regards the voluntary notification of consumption is of material interest, since this town shares with Manchester the credit of having been among the first in this country to adopt, in 1899*, a system of notification, and Dr. Arthur Newsholme, the medical officer of health of Brighton, has for many years made valuable contributions to the subject of tuberculosis.

* I gather from a paper read at Brighton by Dr. Newsholme on 27th October, 1906, that notification commenced in Brighton in January, 1899, and in Manchester in September of the same year. It may also be mentioned that voluntary notification was introduced into Sheffield in the autumn of 1899.

The following table relative to voluntary notification of pulmonary tuberculosis is taken from the Brighton Annual Reports, and from other sources :—

1. Year.	2. No. of cases notified.	3. No. of cases re-notified.	4. New cases notified per 100,000 population.	5. No. of new cases treated in the Borough Sanatorium.	6. No. of annual deaths from Tuberculosis in Brighton.
1899	111	—	92	—	215
1900	105	—	85	—	232
1901	153	9	124	—	237
1902	224	52°	179	31 (from May)	227
1903	316	82†	251	98	248
1904	363	85†	286	130	259
1905	308	102§	242	129 (a) (exclusive of 6 readmissions)	241
1906	373	119	291	181 (b)	268

* 17 of these have been originally notified prior to, and the rest in, 1902.

† 37 of these have been originally notified prior to, and the rest in, 1903.

‡ 36 of these have been originally notified prior to, and the rest in, 1904.

§ 59 of these have been originally notified prior to, and the rest in, 1905.

(a) Excluding 6 re-admissions.

(b) Excluding 32 re-admissions.

Dr. Newsholme furnishes the following table wherein a comparison is made by him between the Brighton data and those obtained in other towns having voluntary notification; as also with Sheffield where notification has been compulsory since November, 1903.

New cases of Phthisis notified per 100,000 of population.

—	Brighton.	Sheffield.	Manchester.	Liverpool.
1904	286	281	215	236
1905	242	168	223	248
For every 100 deaths from Phthisis in 1904 the number of new cases of phthisis notified was	203	160	119	116

It has to be noted with regard to the above table that at Sheffield voluntary notification came into force in 1899, *i.e.*, some three years before it was made compulsory there; and that, as regards Liverpool, notifications are only asked for in cases where, in the opinion of the notifying practitioners, action can usefully be taken by the officers of the health department.

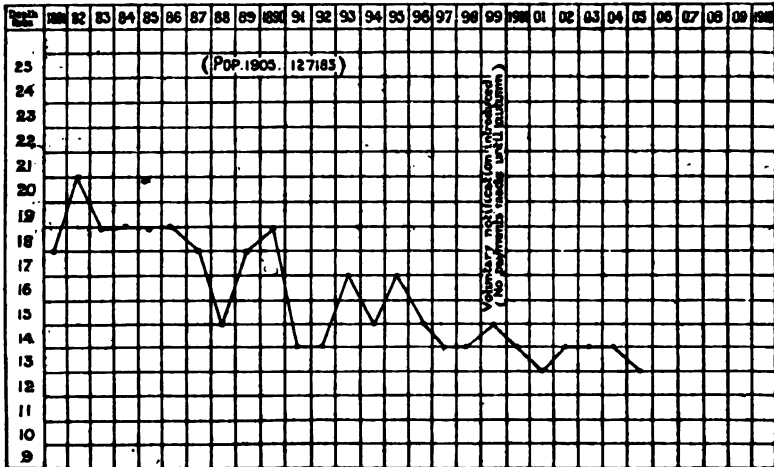
But, as Dr. Newsholme observes, the main interest attaching to his table is the fact that in Brighton a larger proportion of the population having phthisis is notified than in the other towns in question, and this notwithstanding the fact that in Sheffield notification is now compulsory. Further reference will, however, be made to this subject.

The chart below shows the death-rate in Brighton from pulmonary tuberculosis before and after the introduction of voluntary notification. It may be added that in Brighton, in addition to the usually recognised steps in control of phthisis, there has been since May, 1902, a number of tuberculous persons undergoing education *quâ* preventive and health measures at the isolation hospital, the number of whom is shown in column 5 of the first Brighton table. These patients have been placed in the hospital mainly for *educational* purposes, although a certain number of beds are apparently devoted there to the *isolation* of advanced cases. The average stay at hospital of the phthisis patients appears to be about five weeks. Out of 667 cases of phthisis under observation in Brighton in 1906, 52 per cent. had spent at least a month in the hospital. It will, therefore, be seen that the element of isolation has, as regards recent years, to be borne in mind in studying the Brighton chart but it should be remembered that the period of isolation is, as a rule, but a brief one.

The number of specimens of sputum examined at the instance of medical practitioners in Brighton has been year by year as follows :—

Years.	Number of specimens.	Years.	Number of specimens.
1899	47	1903... ..	227
1900	86	1904... ..	284
1901	125	1905... ..	279
1902	146	1906... ..	474

Death-rate from Pulmonary Tuberculosis in Brighton (per 10,000) from 1881-1905.



N.B.—The recorded pulmonary tuberculosis death-rate for 1906 was 14·4, the corrected 13·3. The rates furnished in the chart are apparently the recorded rates.

Liverpool.

(Population, estimated, in 1906, 739,180.)

A system of voluntary notification of pulmonary tuberculosis was introduced into this city on February 14, 1901, and the number of notifications annually received has been as follows :—

—	1901.	1902.	1903.	1904.	1905.	1906.
Notifications received	1,898	2,274	2,067	1,897	1,971	1,950
Duplicates	101	75	198	188	110	188
Total	1,797	2,199	1,874	1,709	1,861	1,842
Deaths	1,302	1,347	1,258	1,282	1,245	1,170
Rooms disinfected ...	506	662	746	824	614	696
Bedding removed for disinfection ...	155	24	36	32	64	39

It will be noted that there was during the three years 1902-1904 a diminution in the total number of notifications although in each year the number of such notifications has exceeded the deaths. In 1905 and 1906, however, the number of notifications increased again somewhat.

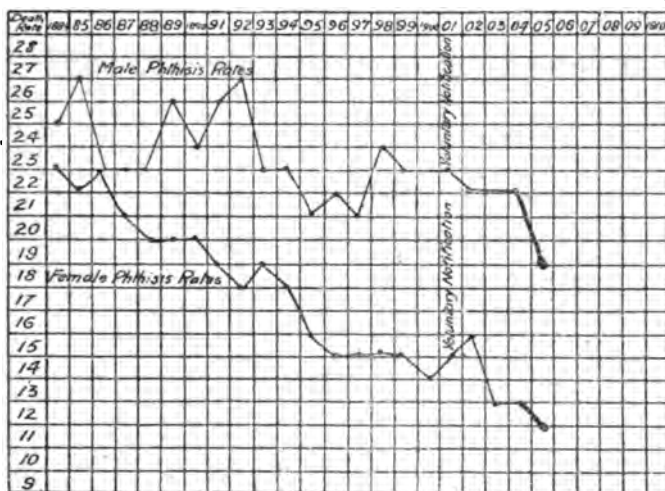
Dr. Hope states in his annual report for 1906 that :—

“The system of voluntary notification of those cases of consumption in which the services of the Health Department could be of use came into operation on February 14, 1901, and has been continued with good results.”

It is important to observe that the notification of phthisis at Liverpool is left to the judgment of the medical practitioners.

The following chart, taken from Dr. Hope's annual report for 1903, gives the male and female death-rate from phthisis in Liverpool since 1884. To Dr. Hope's data the figures for 1904-5 have been added.

Death-rate from Pulmonary Tuberculosis (per 10,000) in males and females from 1884-1905.



Cardiff.

(Population, estimated, 1906, 183,823.)

Voluntary notification of pulmonary tuberculosis was introduced into Cardiff in 1901, and in March, 1903, a Woman Inspector was appointed to visit all cases of phthisis notified to the Medical Officer of Health. The bacteriological examination of sputum is carried out gratuitously, and spitting in public places or in vehicles is an offence punishable by law. Disinfection after death from phthisis is very generally carried out.

As regards the results obtained, the Medical Officer of Health observes in his Annual Report for 1905:—

“On the whole this system has proved of service, those cases being notified in which the medical practitioner considers that the assistance of the officers of the sanitary authority would be desirable. Each case is visited immediately after the receipt of the notification, and the visit is repeated when necessary.

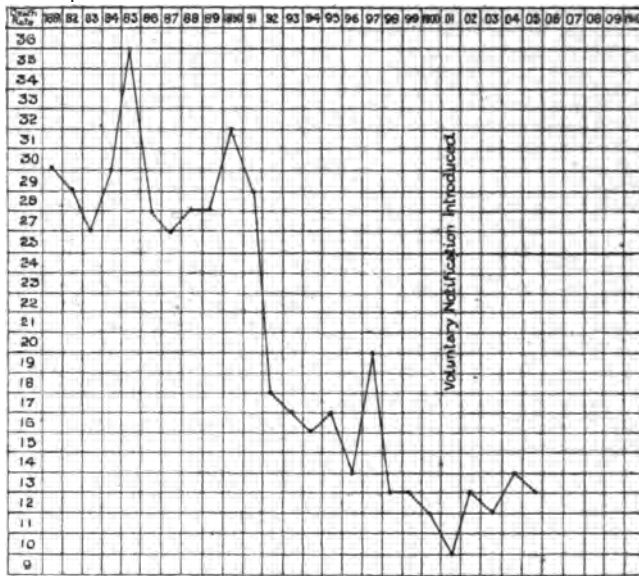
“During 1905 167 notifications of phthisis were received by the medical officer of health; of these 96 were males and 71 were females. Of the males 36 were inmates of the union infirmary, and 8 were in receipt of out-door relief; of the females 13 were patients of the same infirmary and 4 were in receipt of out-door relief.

“One hundred and forty-seven applications were made for the disinfection of premises and articles in cases of notified phthisis.”

It is important to note that only such cases are notified as are likely in the opinion of the notifier to be living under conditions wherein a visit of an officer of the sanitary authority is likely to prove useful.

The chart which follows shows the behaviour of pulmonary tuberculosis in Cardiff, both before and since the introduction of notification.

Death-rate from Pulmonary Tuberculosis in Cardiff (per 10,000) from 1881-1905.



N.B.—The death-rate from pulmonary tuberculosis in 1906 was 12 per 10,000.

Warrington.

(Population, estimated in 1906, 70,364.)

Voluntary notification of pulmonary tuberculosis was introduced October 1, 1901.

Year.	Notifications.	Deaths.	Death-rate per 10,000 of Population.
1901	40 (Oct. and Dec.)	90	13.9
1902	73	79	11.9
1903	52	84	12.5
1904	75	80	11.6
1905	77	95	13.7
1906	80	111	15.7

In his annual report for 1904, Dr. Gornall, the Medical Officer of Health observes :—

"Unfortunately most of these cases, if really phthisis, are brought to our notice at a comparatively late stage of the disease, so that were it in our power to provide sanatoriums for them it would be of no avail. Regular disinfection of the premises in which cases of phthisis have died is carried on, and in a certain number of instances this has been done after removal of a case from one house to another."

In his Annual Report for 1905, he states :—

"It was with a view to obtaining the co-operation of the medical profession in the war against consumption that an invitation was issued in 1901 to the doctors volunteering to notify all cases of phthisis at the same remuneration as is paid for ordinary infectious cases. The general result of this invitation has on the whole been very disappointing and shows that we are not in the least likely to obtain the needed information unless compulsory powers such as some places, *e.g.*, Sheffield, already possess, are obtained.

"A very small minority indeed of the doctors notify cases of phthisis, though they all must see cases from time to time, and most of those cases that are notified are already approaching the end of their career. . . .

"A considerable proportion of consumption of the very poorest classes, labourers and persons of like standing, fall eventually under the protection of the Poor Law, and are attended by the parish doctor, but for some reason comparatively few appear to die in the Warrington Workhouse.

"From the beginning of the year 1905 (up to the present date, November 9) 63 cases of phthisis have been notified by medical practitioners ; of these 35 are already dead and 28 are still, as far as we know, living in various states of ill-health. Of the latter some particulars are given in the tables, from which it will be seen that some since the first visit have disappeared (whether to other addresses or the workhouse hospital we have no means of telling), some are getting worse, while others have improved and are back again at work or school."

Scarborough.

(Population, estimated, 1906, 49,670.)

The Annual Report of the Medical Officer of Health for 1904 states that—

"Voluntary notification of consumption was instituted early in the year, and 25 notifications were sent to me during the year. The prejudice against disinfection after death from consumption is still fairly strong, but with the assistance of the medical profession it will gradually become less. A gratifying feature is that in connection with several cases this year disinfection was requested. During this year 39 deaths were registered from this cause as compared with 37 in 1903."

"A wing has lately been added to the Cottage Hospital, which is intended to be used for the reception of phthisis pulmonalis occurring in the town."

In his Annual Report for 1905, the Medical Officer of Health adds that in 1905 there were only 12 cases notified, there being

in the same year 40 deaths, and the steps which were taken in those 40 cases were as follows :—

	Cases
All information refused	5
Disinfection declined... ..	21
Rooms and clothing disinfected	9
Rooms disinfected previously	5
	<hr/> 40

In 1906 but 5 notifications were received.

Death-rate from Pulmonary Tuberculosis (per 10,000) in Scarborough from 1881–1906.

Year.	Per 10,000.	Year.	Per 10,000.	Year.	Per 10,000.
1881 ...	18.3	1890 ...	14.6	1899 ...	12.5
1882 ...	22.3	1891 ...	13.5	1900 ...	10.8
1883 ...	16.9	1892 ...	12.5	1901 ...	9.4
1884 ...	15.8	1893 ...	14.6	1902 ...	8.7
1885 ...	23.8	1894 ...	19.3	1903 ...	9.4
1886 ...	18.9	1895 ...	14.0	1904 ...	10.3
1887 ...	14.4	1896 ...	11.3	1905 ...	9.6
1888 ...	12.7	1897 ...	10.1	1906 ...	8.1
1889 ...	15.3	1898 ...	11.9		

These figures may well be held in view in any attempt to gauge the effect of voluntary or compulsory notification.

Stockport.

(Population, estimated, 1906, 99,646.)

The Annual Report of Medical Officer of Health for 1904 states :—

“The voluntary notification of phthisis has unfortunately lapsed almost into disuse, but your Committee has recently authorised me to once more bring it into operation and to circularise the medical practitioners accordingly.”

In the annual report for 1906 is the following encouraging statement :—

“Excellent response has been received from the medical practitioners in the town, no fewer than 161 cases having been brought to our knowledge.”

City of Exeter.

(Population, estimated, 1906, 48,000.)

In his Annual Report for 1905, the Medical Officer of Health states :—

“The voluntary notification of phthisis, so far as the City is concerned, has again been a complete failure, not a single case having

been notified, although the Council offer to pay the usual fee for notification. . . .

"The death rate from phthisis for the past year was 1.25 per 1,000, which is again below the average."

Bath.

(Population, estimated, 1906, 50,000.)

In the Annual Report of the Medical Officer of Health of Bath for 1905, the following passage occurs:—

"The notification of phthisis was made permissible in Bath on November 24, 1900, and since that date 96 cases have been notified, the same fees being paid as for other infectious diseases. During the same period over 230 deaths from phthisis have been registered, so that we do not get more than about one-fifth of the cases notified. This is very disappointing, but is in great measure due to the difficulty of detecting the disease in its early stage because the sufferers do not present themselves for examination soon enough. But some good has been done, particularly by the removal of highly infectious cases to the workhouse infirmary.

"The good work of this institution is not confined to advanced and hopeless cases; the open-air treatment is freely offered to men who otherwise would have no chance of being cured. It was adopted at the workhouse on October 15, 1903. On February 6, 1905, Dr. Craddock reported 67 cases as having been admitted, 10 of whom had been discharged cured, 22 left while under treatment, and 21 died. Since that time there have been 55 patients under treatment with the following results: Cured, 8; died, 11; removal, 2; discharged themselves, 19; under treatment, 18. These results are very encouraging considering the advanced stage of most of the cases.

"I hope the time is not far distant when the notification of phthisis will be compulsory. I believe that very little inconvenience would result. No one would think of enforcing penal clauses except for wilful expectoration in public places, and for this we already possess powers which we do not use. The whole system of notification is or should be confidential. Extra precautions might be taken in the case of phthisis to see that no injury was done by notification."

It will be seen from the foregoing statements that voluntary notification has yielded very divergent results, and it is difficult to explain the observed discrepancies. The suggestion which at once arises is that the popularity and tact of the officials of the health department may be a determining factor, and it would not be difficult to adduce evidence in support of this view. It would seem, too, that there is less difficulty in carrying out a system of voluntary notification of phthisis in large than in small communities, and hence arises the suggestion that where the relations between the medical practitioners and the health officers are in a sense impersonal better results are likely to accrue than where, as in a smaller place, the relations are of necessity more intimate. It is, also, not improbable that the success which has attended voluntary notification in Brighton may be, as Dr. Newsholme suggests, largely due to the circumstances that there are some beds set apart at the isolation hospital for the education of a certain number of phthisical patients. It should, in fact, be

borne in mind that, as regards Brighton, many of the patients have been separated from their relatives for five weeks or more, and it will therefore be interesting to note hereafter whether the fall of the tuberculous death-rate is accelerated by this temporary cutting off of possible sources of infection and by the object lesson in sputum control which is afforded at the hospital. In certain instances disinclination of medical men to notify may be due to over zealous inspectors, who have by their visits drawn public attention to the fact that a person is tuberculous and hence in the view of some persons highly dangerous. It is obvious that the more the communicability of consumption is laid stress upon the more difficult will a person suffering from the disease find it to continue in his employment, more especially where such employment involves tolerably intimate association with his fellow workmen.

It will now be well to consider how far the information available relative to compulsory notification sheds any additional light upon the question.

CHAPTER III.

COMPULSORY NOTIFICATION OF PULMONARY
TUBERCULOSIS.

Experience with regard to compulsory notification in this country is very small, being confined to the towns of Sheffield and Bolton. It is proposed, however, to furnish the experience of both these places, so far as it has gone, and by way of a further study of the subject to consider also the experience of New York, in which city what is termed compulsory notification has been in force since 1897.

Before dealing in detail with the question of the compulsory notification of pulmonary tuberculosis, attention may be drawn to the fact that in connection with this subject several proposals have been made by local authorities in this country to make the disease compulsorily notifiable with the object of its being regarded as a "dangerous infectious disorder," under the Public Health Acts. If this result were attained persons suffering from the malady would no doubt be treated as subject to all the legal and social disabilities which attach to individuals suffering from small-pox and other similar maladies.

The Local Government Board has, however, invariably referred back proposals of this nature for further consideration, and they have pointed out disadvantages which attach to the proposal.

In this connection it is useful to consider the legal consequences of regarding pulmonary tuberculosis as one of the "dangerous infectious disorders," and scarlet fever may be taken as a type of such maladies. It is, indeed, desirable to set the matter out clearly as certain local authorities who have in the first instance been anxious to place consumption in the same category as other acute infectious diseases have expressed considerable surprise when the possible legal and social consequences of the proposal were fully explained to them. They have at once withdrawn their application or modified it in such fashion as to render it feasible.

A patient suffering from scarlet fever has at once to be notified to the sanitary authority, and the fact that he is so suffering subjects him to all the penalties and disqualifications comprised within the Public Health Act, 1875, and other Acts relating to infectious diseases, *i.e.* :—

1. The patient may under certain circumstances be compulsorily removed by order of any justice to an isolation hospital.

2. By the provisions of Section 126

Any person who

- (1) While suffering from any dangerous infectious disorder wilfully exposes himself without proper precautions against

spreading the said disorder in any street, public place, shop, inn, or public conveyance, or enters any public conveyance without previously notifying to the owner, conductor, or driver that he is so suffering; or

(2) Being in charge of any person so suffering so exposes such sufferer; or

(3) Gives, lends, sells, transmits, or exposes without previous disinfection any bedding, clothing, rags, or other things which have been exposed to infection from any such disorder; shall be liable to a penalty not exceeding five pounds; and a person who while suffering from any such disorder enters any public conveyance without previously notifying to the owner or driver that he is so suffering shall in addition be ordered by the court to pay such owner or driver the amount of any loss and expense they may incur in carrying into effect the provisions of this Act with respect to disinfection of the conveyance.

By Section 127 it is incumbent upon every owner or driver of a public conveyance to immediately provide for the disinfection of such conveyance after it has to his knowledge conveyed any person suffering from a dangerous infectious disorder, and by the following section (128) a penalty is imposed upon any person—inclusive of an innkeeper—who lets any room in which a person has been suffering from a dangerous infectious disorder without having such room thoroughly disinfected.

The above are the main legal provisions; but it has to be added that it is customary in well administered sanitary districts, when a child is suffering from scarlet fever and is detained at home throughout its illness, to keep back other children in the same house from school, and, under certain circumstances, to withhold adults from work until the patient has recovered and the premises have been disinfected.

Now in this country during the whole duration of notified illness the scarlatina patient is subjected to the above disabilities. In the case of scarlet fever such disabilities last as a rule for no longer than two months, but in the case of consumption such disabilities might, if the disease was grouped as a "dangerous infectious disorder," legally attach to the patient and his people for several years. During such time he would be unable to venture beyond the curtilage of his house, travel by rail, or enter a hotel without subjecting himself to the risks of prosecution. Seeing that a large per cent. of the population suffers at one time and another from tuberculosis, it is obvious that were those disabilities entailed generally by tuberculosis in all its forms and were the tuberculin test generally practised, very serious consequences might ensue.

It will be seen from what follows that in actual practice compulsory notification of pulmonary tuberculosis means something very different from that which is involved in connection with the other notifiable diseases. It will, indeed, be apparent that in so far as England is concerned compulsory notification of the disease has been used at Sheffield largely as a means of protecting the medical practitioner against any penalties to which he might conceivably be subjected for the notification of a disease not otherwise statutorily subject to notification.

Consumptive persons have been protected in Sheffield from operation of the penal sections of the Public Health Act, 1875, by the introduction into the Sheffield Act of the following clause.

No provisions contained in any general or local Act of Parliament relating to infectious diseases shall apply to tuberculosis of the lung or proceedings relating thereto under this section. (See pages 607-609.)

Sheffield.

(Population, estimated, in 1906, 447,951.)

The experience as regards Sheffield is of special interest because, as has already been pointed out, this is, with the exception of Bolton, the only district in England and Wales in which compulsory notification of pulmonary tuberculosis is in force. Unfortunately, however, in so far as the value of the Sheffield figures are concerned, the compulsion only came into operation in the autumn of 1903, so that the statistics at present available are insufficient basis for any very trustworthy conclusions. The following is a brief narrative of the circumstances which led up to compulsory notification of phthisis in Sheffield and of the steps which are taken there under the Act (Sheffield Corporation Act, 1903) conferring the powers in question.

It is necessary in the first place to point out that *voluntary notification*, coupled with certain preventive measures, was previously in operation in Sheffield since the autumn of 1899. The following extracts from the annual reports of Dr. John Robertson, who was medical officer of health at the time when compulsory notification was introduced and who now holds a similar position at Birmingham, serve to show how compulsory came to be substituted for voluntary notification of phthisis.

In November, 1899, the Medical Officer of Health, in a circular letter addressed to the medical practitioners of Sheffield relative to the control of tuberculosis, stated that:—

"Among other measures which will greatly assist in this will be the notification of such cases of tuberculosis as you may deem it advisable to notify. *Only such cases as are in an infectious condition* require to be notified, and for this purpose the Corporation have arranged that on a medical practitioner sending a sample of sputum or other infectious matter from a patient to the Bacteriological Laboratory in connection with University College, Sheffield, such material will be examined (free of charge) for tubercular bacilli.

"The mere sending of the sputum to the Laboratory will be taken as a notification provided the bacillus is found to be present.

"A special sanitary inspector will be detailed to visit the houses and, if necessary, the workplaces of persons suffering from tuberculosis, and the greatest care will be taken that patients shall not be interfered with who are adopting reasonable means of preventing the spread of the disease.

"In order that the system may work well it is necessary that each individual case should only be notified once, and therefore, if you find that a patient has been duly notified, I should be glad if you would not notify such a case."

"There may be a few patients whom you may think it desirable not to notify to me, in which case I shall be much obliged by your co-operation in endeavouring to instruct them in preventive measures."

In his Annual Report for 1901, Dr. Robertson stated :—

"The notification of infectious cases of tuberculosis has been continued, and although there is still a certain number of medical men who possibly do not notify some cases which would be benefited by it, yet the number of cases which we become aware of by this method is very considerable. The experience which has been gained during the past two years in the work of visiting the houses where persons suffering from tuberculosis reside has led to the firm conviction that the compulsory notification of cases as distinguished from our present voluntary notification would be an immense gain and would not militate in any way against the consumptive. It cannot be too strongly insisted on that consumption is perhaps of all preventable diseases the one in which methods of prevention are most easily and accurately carried out."

Prior to the coming into operation of compulsory notification of phthisis, the Medical Officer of Health circularized the medical profession in a letter which, while explaining the provisions of the new Act, stated :—

"The voluntary notification of tuberculosis has been extremely satisfactory in Sheffield, and the Health Committee desire to thank the medical profession for their loyal support in the past in notifying these cases. One of the most important reasons for seeking compulsory powers in this respect was to do away with any risk to the profession, who, in voluntarily notifying such cases, might be considered to be betraying a professional secret and thereby rendering themselves liable to action for damages. . . .

"It will be noted that great care has been taken in keeping all the requirements relating to this form of tuberculosis quite separate from those contained in the general Acts relating to other infectious diseases. The object the Corporation had in view in doing this was to prevent at any time injustice being done to the large number of persons suffering from tuberculosis who daily follow their employment or of necessity must take open-air exercise.

"All cases of tuberculosis of the lung are to be notified."

The letter, after drawing attention to the importance of bacteriological examination of sputum and the facilities obtaining for such examination, continued :—

"*Special cases.*—There will probably be a few cases where the medical practitioner desires to look after the preventive measures to be adopted by his patient. In such cases, a statement to this effect should be made at the time of notifying and an undertaking given that the practitioner will see that the required preventive measures are carried out and will report on their fulfilment at least twice in every year (copies of the preventive measures to be adopted and forms of report will be forwarded if required). If these conditions be fulfilled no visits will be made to the patient's house by any member of the staff of the Health Department. In order that citizens may know of the obligations cast on medical practitioners, public notice has been given of this by advertisement in the newspapers and by handbills and otherwise in the city."

It will be noted as regards Sheffield that apparently under the scheme of voluntary notification *only such cases as were in an infectious condition* were required to be notified, whereas under the compulsory notification *all cases of tuberculosis of the lung are to be notified*.

In referring to the subject of compulsory notification in his Annual Report for 1903, the Medical Officer of Health observes in reference to the powers conferred by the Bill :—

“It was an easy matter to put these powers in operation, for they practically make compulsory everything that had been carried out successfully by voluntary co-operation during several years. The section however removed a most objectionable risk which the medical attendant ran when voluntarily notifying previously.”

Having regard to the interest which from an administrative and public health standpoint attaches to Section 45 of the Sheffield Corporation Act, 1903, a copy of it will be found at the end of this chapter; it is important that special attention be directed to sub-section (5). It is by the operation of this sub-section that persons suffering from tuberculosis of the lungs in quite its initial and uncommunicable stages are not liable to be prosecuted when they expose themselves in the public streets. Had consumption been regarded as a “dangerous infectious disorder” consumptive persons would technically have been in the same position, *quâ* legal disabilities and prosecutions, as a patient suffering from, say, small-pox, and in the case of consumption this technical disability might have continued for many years.

It will be noted that the provisions of the section are to cease to operate at the end of seven years unless continued by Act of Parliament or Provisional Order of the Local Government Board.

By this time some valuable information relative to the utility or otherwise of the measure should have been collected at Sheffield.

At the end of the section will be found a copy of the certificates used in Sheffield with reference to notification and investigation of phthisis cases.

In his Annual Report for 1904, Dr. Scurfield, the present Medical Officer of Health, observes, relative to the steps taken on notification :—

“Two inspectors are engaged in this work. They visit the homes of the patients and leave copies of printed instructions designed for promoting the chances of cure and diminishing the risks of infection. They advise as to the necessity of plenty of fresh air, distribute pocket spittoons to those too poor to buy them, and disinfect the patients’ rooms by spraying with formalin at each visit during the later stages of the illness. It is not to be expected that the full benefit of the new provision will be obtained until something is done in the way of providing hospital accommodation for the badly housed advanced cases and sanatorium treatment for the early and curable cases.”

It appears that between November 1st, 1903, when compulsory notification commenced, and October 31st, 1905, there were 1,060 deaths in Sheffield registered as due to pulmonary tuberculosis, and that of this number only 62 died without being notified.

Dr. Scurfield states that since the compulsory provisions have been in force :—

"There has been no opposition on the part of the public or the medical practitioners. I have no doubt there has been some little failure to notify on the part of medical practitioners. This, however, is what one would expect with a new Act."

He adds :—

"I think that the Act is now being fairly well complied with. There are a small percentage of cases—about 1-2 per cent—where the medical man does not wish the inspectors to call, in which case the medical attendant is asked to fill in the enclosed form marked 'A' and to use a copy of the enclosed leaflet 'Advice with regard to consumption.' (Form and leaflet not reproduced.)

"The provisions of the Act are being carried out without friction, and I am of opinion that the work is doing a considerable amount of good."

Dr. Scurfield tells me that the only compulsion employed beyond that conveyed by the Act itself is to remind medical practitioners that pulmonary tuberculosis is compulsorily notifiable when a death from consumption is registered of a person who has not formerly been notified.

He also states that during the last two years there have been between 20-30 cases annually concerning which notifications have been received, but who have been certified to have died from causes other than tuberculosis. In these cases the medical practitioner is written to and invited to revise the certificate. If he revises it the revision is accepted, if he adheres to it the certificate stands. The names of a few have been removed from the register in consequence of recovery.

Compulsory notification came, as has been said, into operation at Sheffield in November, 1903, and up to the end of the year 372 cases were notified under the Act. Of this number 141 were cases which had been previously notified under voluntary notification. Of the 377 cases re-notified in 1904, 27 were second notifications by the same medical man, and the remaining 350 were re-notifications of one case by a different medical man.

The following tables, A and B, have been furnished by Dr. Scurfield specially for the purposes of this report, and they show the progress as regards notification up to the end of the year 1906.

City of Sheffield.

TABLE A.

Table showing number of Deaths and Notifications with regard to Tuberculosis of Lung, received and recorded year by year from 1899-1905.

	1899. (One month of notification).	Voluntary Notification.				Compulsory Notification.		
		1900.	1901.	1902.	1903.	1904.	1905.	1906.
Number of deaths from pulmonary tuberculosis...	502 (whole year)	539	580	493	573	536	490	452
Notifications received	33	585	648	739	918	1,216	1,057	1,122
Notifications recorded*	30	356	343	404	†728	1,216	1,057	1,122
(a) New cases belonging to City ...	29	309	282	326	519	826	741	694
(b) Cases previously recorded—								
(1) Under voluntary system ...	—	30	41	62	168	97	20	20
(2) Under Local Act ...	—	—	—	—	32	278	286	393
Notifications of cases whose addresses were not in City (charitable institution cases chiefly).	1	17	20	16	9	15	7	12
Revised diagnoses	—	—	—	—	—	—	3	3

* Under the voluntary system, only those cases were recorded whose sputum on examination was found to contain tubercle bacilli.

† Voluntary, January to October, 855; Under Local Act, November and December, 878.

City of Sheffield.

TABLE B.

NOTIFICATIONS OF TUBERCULOSIS OF LUNG 1905.†

Year.	New cases.			Notifications of cases already notified.		
	Private practice.	*Public institution (except Poor Law).	†Poor Law Institutions.	Private practice.	*Public Institutions (except Poor Law).	†Poor Law Institutions.
1905	338	202	201	71	62	173
1906	373	132	189	84	76	253

* Public institution cases include those notified by medical officers of friendly societies.

† Poor law institution cases include any friendly society cases notified by union medical officers, which are not distinguished as such.

‡ Exclusive apparently of 10 cases shown in Table A as "revised diagnoses," or resident outside city.

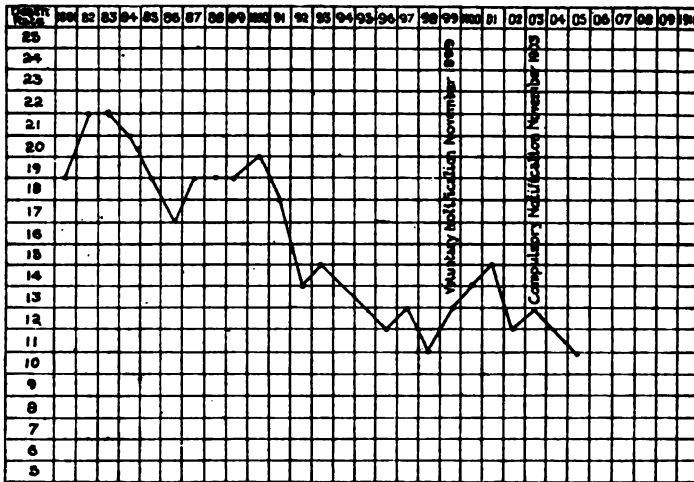
The following table shows the interval between notification and death in those cases in which such information had been obtained. (The cases referred to are those notified between July 1 and December 31 in 1904.)

Surviving at 3 months after notification, 62·2 per cent.

"	6	"	"	52·3	"
"	9	"	"	45·0	"
"	12	"	"	39·6	"
"	15	"	"	35·6	"
"	18	"	"	33·5	"

The chart furnished below indicates the fall in the death-rate from pulmonary tuberculosis which took place prior and subsequently to the introduction of both voluntary and compulsory notification. Perhaps a sufficient interval has not elapsed to judge the effects of compulsory notification; the death-rate recorded in 1898 was practically the same as that registered for 1905.

Death-rate from Pulmonary Tuberculosis in Sheffield (per 10,000) from 1881 to 1905. (In 1906 the rate was 10.1 per 10,000.)



Dr. Scurfield, in his annual report for 1905 makes the following statement:—

The adoption of compulsory notification has revealed the fact that the death-rate from consumption has probably been considerably under-rated in the past, seeing that no less than 26 notified consumptives were certified during the year as having died from other causes, Nine of these were classed under tuberculosis of the lungs after consultation with the medical attendant, and 18 were classified under other headings.

It may be added that the Sheffield Corporation has recently converted an existing house into an institution partly for educational purposes and partly for the selection of suitable cases of pulmonary tuberculosis to be sent by the Corporation to sanatoria belonging to other bodies.

Bolton.

(Population 1906, 180,502.)

Voluntary notification of phthisis was adopted in this borough on July 7th, 1902, and Dr. J. E. Gould, the Medical Officer of Health, has kindly furnished me with data concerning this and compulsory notification.

Under section 52 of the Bolton Corporation Act, 1905, compulsory notification of the disease, subject to the usual differentiation between phthisis and the acutely infectious diseases, came into force on October 9th, 1905, for a period of five years.

Sub-section 1, of section 52 of the Act referred to, reads as follows:—

“(a) Every registered medical practitioner attending or called in to visit any person within the borough shall forthwith, on becoming aware that such person is suffering from tuberculosis of the lung, send to the

medical officer a certificate on a form to be supplied to him gratuitously by the Corporation, stating the name, age, sex, and place of residence and employment or occupation (so far as can be reasonably ascertained) of the person so suffering, and whether the case occurs in his private practice or in his practice as medical officer of any hospital, public body, friendly, or other society or institution. (b) Any such medical practitioner who fails to give such certificate shall be liable on summary conviction to a fine not exceeding forty shillings.

Another part of the same section contains the Sheffield proviso that :—

No provisions contained in any general or local Act of Parliament relating to infectious diseases shall apply to tuberculosis of the lung, or proceedings relative thereto under this section.

The number of notifications and deaths from phthisis in Bolton since 1902 is herewith set out :—

Year.	Notifications.	Deaths.
1902 (part of)	80	253
1903... ..	92	218
1904... ..	93	221
1905 (compulsory since Oct. 9th)	150	210
1906... ..	262	202
1907 (first half)	119	—

Up to July 20th, 1906, no sanatorium treatment had been undertaken, but on that date four beds at the Westmorland Sanatorium at an annual cost of £80 per bed (since increased to £90) were utilised for Bolton patients.

The cases are admitted subject to the following restrictions imposed by the Westmorland Sanatorium :—

- (1) "That the cases sent be not advanced and hopeless, and, if such are sent, we reserve the right to discharge them."
- (2) "That the cases be sent of that sex which we can accommodate at the time."

The question of providing a separate sanatorium for Bolton is under consideration.

The fees paid for notifications are as specified below :—

First notification by a medical practitioner or notification of a case previously notified by another medical practitioner, 2s. 6d.

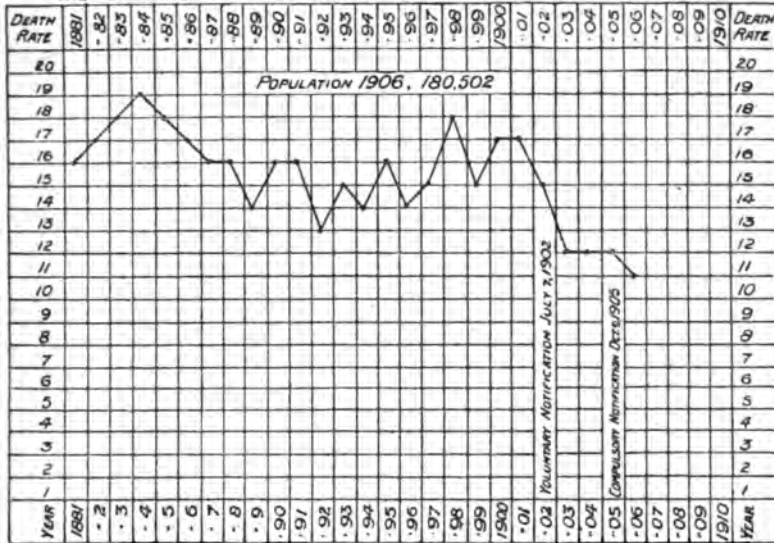
Notification by a medical practitioner of change of address of a case previously notified, otherwise than into a public institution, 1s.

Notification on behalf of public institution of cases not previously notified by medical practitioners, or of a change of address of a patient, 1s.

On the receipt of notifications the usual steps as regards instruction, &c., are taken.

The subjoined chart shows the behaviour of phthisis in Bolton both before and after the introduction of voluntary and of compulsory notification respectively.

CHART SHOWING DEATH RATE FROM PULMONARY TUBERCULOSIS PER 10,000 OF THE POPULATION IN THE BOROUGH OF BOLTON FROM 1881-1906.



LOWEST WHOLE NUMBER RECORDED IN EACH CASE AND WHERE RATE IS MIDWAY BETWEEN TWO WHOLE NUMBERS THE LOWEST WHOLE NUMBER IS TAKEN

This chart presents some interesting features, more especially when considered in relation with other charts presented in this chapter. It will be seen that voluntary notification came into force in July, 1902, in which year the death-rate from pulmonary tuberculosis fell two per 10,000, the following year showing a fall of three per 10,000. If this latter fall was associated with voluntary notification in the sense of cause and effect it becomes difficult to understand why no such immediate fall has been noted elsewhere. Having regard to the other charts in this chapter, relation of the fall, as a result of voluntary notification of the disease, must be regarded as doubtful.

New York.

(Population, 2,390,382.)

The City of New York is considered because it was here, owing to the initiative of its well known medical officer, Dr. Hermann Biggs, that a system of voluntary notification was introduced as far back as 1893; to New York, indeed, must be accorded the honour of having been the first city in the world to actually take specific measures against pulmonary tuberculosis. Moreover, this system of voluntary notification in New York was in 1897 replaced by what has been termed "compulsory notification."

The measures which have been taken in New York for the control of tuberculosis are ably set out by Dr. Hermann Biggs in his contribution to the first annual report (1904) of the Henry Phipps Institute, and short abstracts therefrom are here furnished.

1. A system of partially voluntary and partially compulsory notification was adopted in 1893. Public institutions were required to report cases coming under their supervision; private practitioners were requested to do this. In 1897 the Health Department adopted regulations requiring the notification of all cases.

It is important, however, to point out that—

“For a number of years, while continuous pressure was brought to enforce this provision, it was not strictly enforced, although more and more complete compliance with the requirements was last year obtained.”

Dr. Hermann Biggs also observed—

As tuberculosis radically differs from the more communicable diseases usually called contagious, so the measures for the sanitary supervision of tuberculosis must differ from the measures adapted in this class of disease. This should be the attitude of health authorities always in the enactment of all regulations. The information contained in the reports of cases should be regarded as confidential information, and action should only be taken by the authorities in those instances where the conditions require it.

The notification of a case of tuberculosis does not require any action on the part of the authorities if it seems reasonable to assume that such action is unnecessary. The very fact that tuberculosis is notified by the attending physician as a communicable disease, has the greatest educational value, and justifies the assumption in those instances in which the case is under the supervision of a private physician, that reasonable and necessary precautions for the protection of others will be taken. If, however, the consumptive has the disease in an infectious stage and is without a home or is living in a lodging house or in a poorly furnished room or in a family in a tenement house, or is receiving charitable medical advice through some public institution, then all objection to the interference or the supervision of the authorities is removed, and in the interest of the public such interference and supervision becomes necessary. Such is the attitude which has been adopted in New York City. It is assumed and stated positively that in all instances where the consumptive is under the care of a private physician and the latter will undertake to give such instructions as are necessary to prevent the transmission of the disease to others, no further cognisance of the case will be taken by the health authorities after the registration.

During 1902 more than 16,000 cases were reported to the Department of Health in New York City, of which 4,200 were duplicates, and in 1903 more than 17,000 cases were reported.

The above extracts would seem to have a very important bearing upon the present question of notification, the facts referred to illustrating how very different the consequences of notification may be among the rich and the poor. But the circumstance that the Act works without friction is in itself an eloquent testimony to the tact of the medical officer of health and his staff. The other measures which are regarded as desirable in New York for the control of tuberculosis are, as gathered from Dr. Hermann Biggs' article, the following:—

2. Facilities for the gratuitous examination of sputum; there being about 200 depôts in New York City where the outfits, flasks, &c.,

-- for the collection of specimens of sputum may be obtained, and where the sputum may be left for the department collector.

3. Education by the diffusion of suitable circulars.

4. The visitation of consumptives in their homes. "In the course of these visits it becomes evident in many instances that a patient should be removed to a hospital or sent to a sanatorium outside of the City. In such instances, if possible, the patient should be induced by pressure to avail himself or herself of such institutional care as seems desirable or available. If the patient persistently refuses institutional care forcible removal must be resorted to in those instances in which the unsanitary conditions existing render it necessary."

5. The disinfection and renovation of rooms or apartments which have been vacated by consumptives either by death or removal.

6. Provision for repeated visits to cases in tenement houses wherein are tuberculous subjects.

7. Suitable food, especially milk and eggs, shall be provided by the sanitary authorities, or by other authorities, in suitable cases.

8. The provision of three classes of institutions for consumptives. *Free dispensaries*, where food in addition to medicine should, where necessary, be provided.

Hospitals for the care of advanced cases.

Sanatoria.

Regulations as regards spitting.

With reference to the foregoing scheme, Dr. Hermann Biggs observes:—

The Department of Health of New York City has not as yet undertaken to provide food or assistance to the consumptive poor living at home, where for any reason they cannot, or should not, be removed, neither has it undertaken to provide full regulations for the supervision of such cases in public institutions, in the public schools, and as regards employes in factories and occupations in which consumptives are likely to be a source of danger.

Excepting in these respects, the scheme as presented is practically in force now in New York City. The extent and strictness of the supervision having each year during the last ten years been materially increased.

The data in the table furnished below have been derived as follows. Up to the year 1900 from the interesting address by Dr. Hermann Biggs,* which was communicated to the London Tuberculosis Congress in 1901 by Dr. Janaway; as regards 1901-1903 from a more recent contribution by Dr. Hermann Biggs to the first annual report of the Henry Phipps Institute,† and as regards 1904-1905 from a report furnished by Dr. John S. Billings, Junr.‡ The figures are grouped with a view of bringing out some points which appear to be particularly worthy of consideration.

* Transactions of the British Congress on Tuberculosis, Vol II. William Clowes and Sons, Ltd., London, 1902. "The Notification of Tuberculosis in New York, and its Results." By Hermann M. Biggs, M.D.

† First Annual Report of the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis, February 1st, 1903, to February 1st, 1904. "The Administrative Control of Tuberculosis." By Hermann M. Biggs, M.D.

‡ The Clinic for the Communicable Pulmonary Diseases, Borough of Manhattan Department of Health, City of New York.

Death-rate (per 10,000) from Pulmonary Tuberculosis from 1875 to 1905 inclusive in the Boroughs of Manhattan and New York.

Year.	Annual Rate.	Quin- quennial Rate.	Percentage Rise and Fall since previous Quin- quennium.	Year.	Annual Rate.	Quin- quennial Rate.	Percentage Rise and Fall since previous Quin- quennium.
1875	39.9	38.3	—	1890	34.1	29.9	16.2 (—)
1876	39.0			1891	31.1		
1877	36.5			1892	29.5		
1878	39.2			1893	29.1		
1879	37.0			1894	25.7		
1880	38.9	40.3	5.2 (+)	1895	27.8	26.0	13.0 (—)
1881	42.7			1896	26.2		
1882	41.0			1897	25.0		
1883	40.1			1898	25.1		
1884	38.6			1899	26.0		
1885	37.2	35.7	11.4 (—)	1900	25.7	24.3	6.5 (—)
1886	38.1			1901	25.0		
1887	35.6			1902	22.9		
1888	34.6			1903	24.0		
1889	33.0			1904	23.7		
				1905	23.8		

N.B.—The figures in black type represent the years in which definite administrative action aiming at the control of tuberculosis was inaugurated.

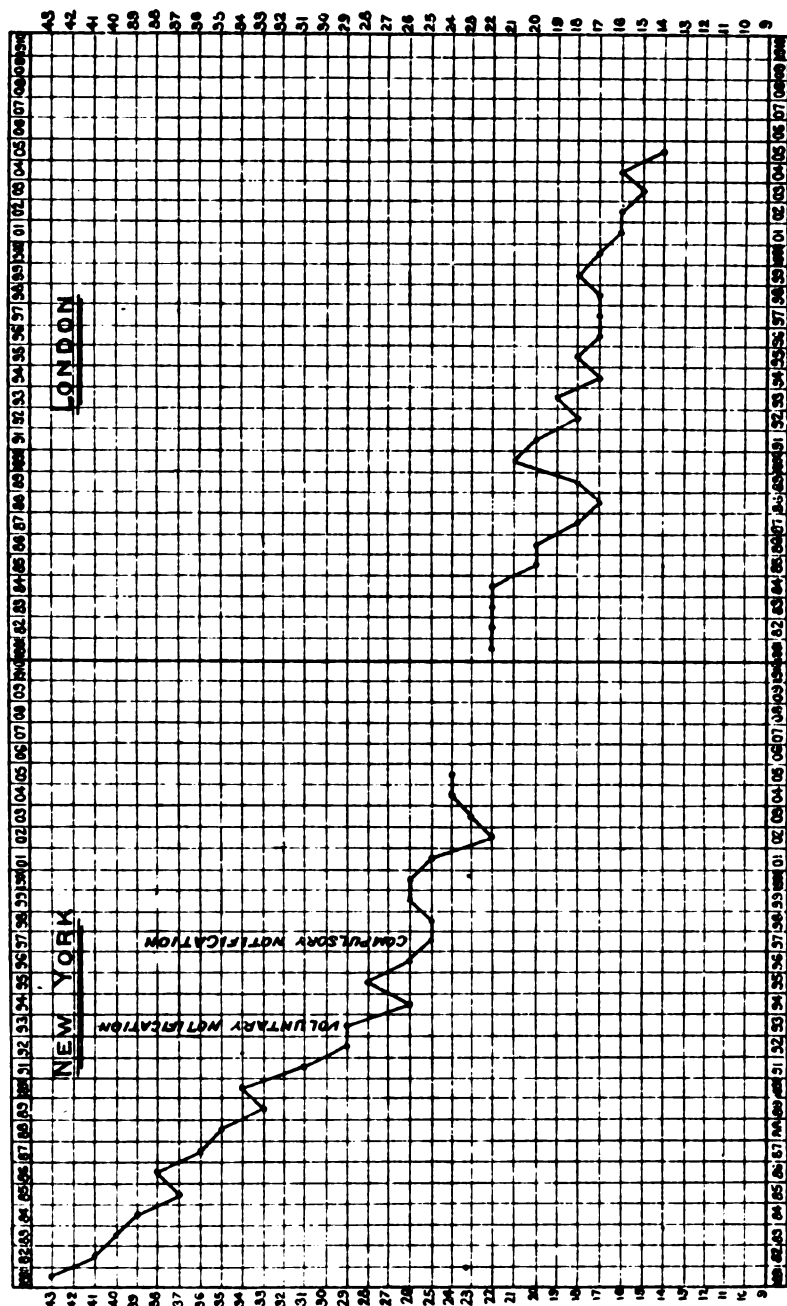
A chart is added illustrating the behaviour of pulmonary tuberculosis in New York since 1881; it shows also the dates of the introduction of voluntary and compulsory notification respectively, and supplies by way of contrast the death-rate from pulmonary tuberculosis in London.

A study of this New York curve and of the figures which precede it suggest some reflections of considerable interest and importance. It is obviously in accordance with anticipation that the several and successive measures which have been taken in New York towards the control of pulmonary tuberculosis should have yielded some definite and detectable result upon the death-rate curve, that is to say, if, as pointed out earlier in this chapter, no new disturbing factors have arisen.

This same subject was dealt with by me in the lectures before the Royal College of Physicians in March, 1903, and it is permissible perhaps here to reproduce a small portion of that lecture which dealt with these New York figures. It refers to the effect of the preventive measures upon the death-rate, and to the manner in which such death-rate had decreased. These remarks are better followed by a reference to the table rather than to the chart, as the chart commences at the year 1881 only.

"Turning our attention to the direct measures which have been taken in New York, it will in the first place be noted that up to 1889

DEATH-RATE FROM PULMONARY TUBERCULOSIS IN NEW YORK AND LONDON FROM 1881 TO 1905.



THE NEW YORK
PUBLIC LIBRARY

no such measures could have been in operation. I will briefly specify what were the administrative measures adopted at the several dates indicated by the figures in black type. 1. In 1889 steps were taken with regard to the milk supply and meat supply, and the public began to be educated in general preventive measures. 2. In 1893-94 notification partly voluntary and partly compulsory, disinfection in certain cases, and the gratuitous bacteriological examination of sputum were introduced; educational methods were developed. 3. In 1897 compulsory notification which, however, is only compulsory in a limited sense, was inaugurated.

"I will now deal separately with each of these measures. With respect to the year 1889 it will perhaps be fairest, seeing that there was an increase in the disease during 1880-84, as compared with the previous five years, and that we have practically two quinquennial periods on either side of 1889 available, if we compare the fall between 1880-84 and 1885-89 with that between 1890-94 and 1895-99.

"We see then that the fall in the first period, *i.e.*, before any direct measures were taken, or rather, were likely to have become operative, was 4.6 per 10,000, or a percentage fall of 11.4 as compared with a fall of 3.9 per 10,000, or a percentage fall of 13.0 after the direct measures were inaugurated.

"It will be seen that the latter period embraces the coming into operation of the measures of 1893-94, as also those introduced in 1897.

"Let us now examine separately the effect of the measures taken in 1893-94, and we may fairly omit these two years from the calculation. As we have the figures for six years succeeding 1893-94, it will be convenient to take for comparison the six years preceding that period.

"In the period 1887-92 the rate fell from 35.6 to 29.5, *i.e.*, a fall of 6.1 per 10,000, or a percentage fall of 17.1. In the years 1895-1900 the rate fell from 27.8 to 25.7, *i.e.*, a fall of 2.1 per 10,000, or a percentage fall of 7.6."

It is possible now to make a more extended examination of the effect of the measures taken in 1897 than was the case at the date of delivery of the lecture from which the above quotation is taken. The further fact may, too, be mentioned that there are now (1906) in New York some 2,100 beds chiefly for the care of advanced cases as compared with some 700 such beds fifteen years ago. This is an important consideration in connection with the question of the influence of the isolation of advanced cases in reducing the death-rate from phthisis. There is, therefore, the additional fact to be considered in relation to this New York chart that during the last 15 years the number of beds available for the isolation of advanced cases has steadily increased.

As the figures are now available for 1905 data are to hand for eight years subsequently to 1897, and these may reasonably be compared with the figures for the eight years preceding 1897. From 1889-1896 the rate fell from 33 to 26.2, *i.e.*, 6.8 per 10,000, against a fall from 25.1 to 23.8 in 1898-1905, *i.e.*, a fall of 1.3 only: a percentage fall in the first period of 20.6 against a fall in the latter period of 5.2, and a glance at the several annual figures serves to show that this is not an unfair manner of stating the case as, of course, it might be under certain circumstances.

The whole of the figures and the chart would appear to indicate that a substantial fall in the death-rate from pulmonary tuberculosis commenced in New York several years antecedent to the date of any special preventive measures, or apparently any very substantial isolation of advanced cases; and that such fall continued after the preventive measures were taken, and is still continuing.

It has, however, to be noted for what it is worth that the greatest fall was between the third and fourth quinquennial periods, when there was a drop from 35.7 to 20.9 per 10,000, or a percentage fall of 16.2; and that antecedent to any preventive measures there was a percentage fall of 11.4.

It is, of course, conceivable that the steps with regard to the milk and meat-supply, and the commencement of education in preventive measures which were taken in 1889, were responsible for the exceptional rate of fall in the five years ending 1894. If so, it would seem to suggest that there was at that time much milk and meat-borne tuberculosis in New York. For it cannot reasonably be contended that the measures taken in 1893-94 would have exercised much effect upon the deaths occurring in either of those years.

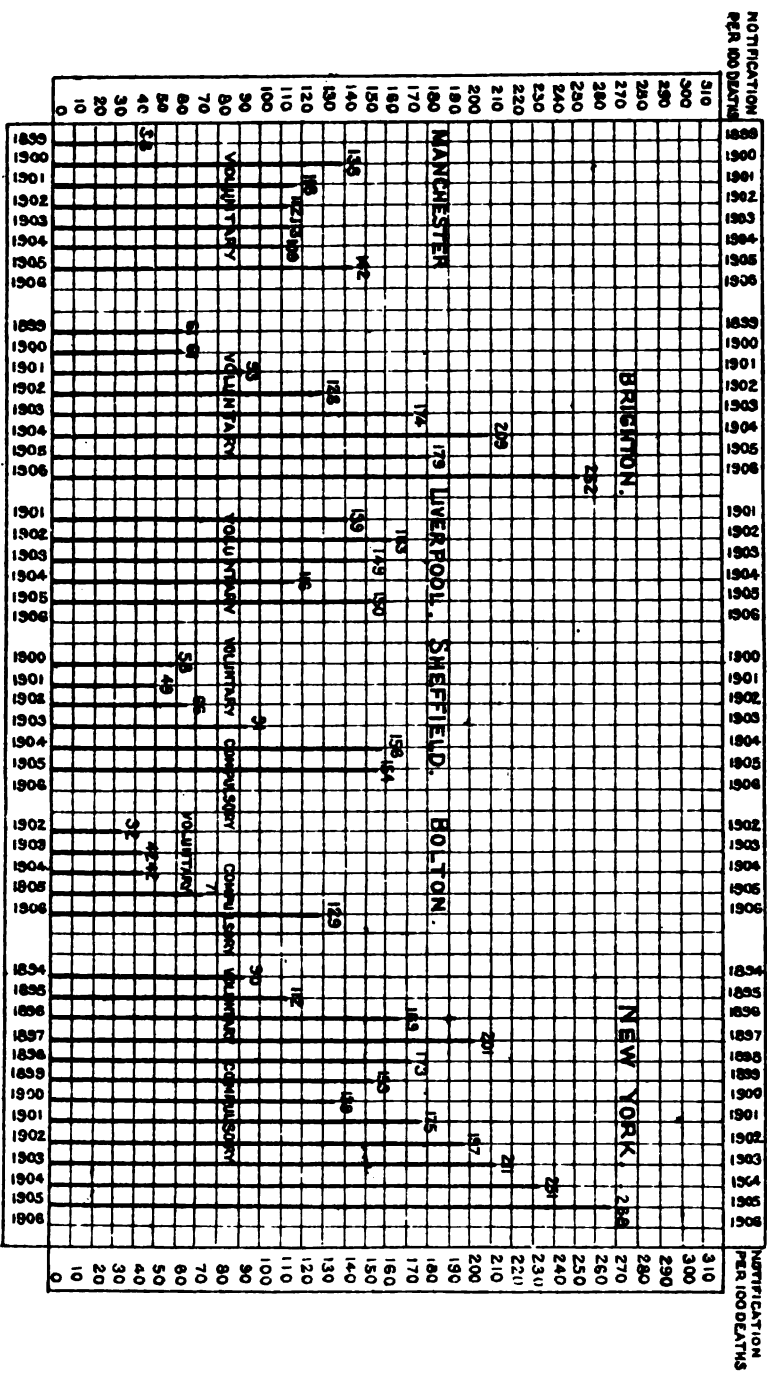
Dr. Hermann Biggs makes the following comments with regard to these New York figures:—

"I do not at all intend to indicate that the whole of the reduction in the death-rate from tuberculosis in New York City has been the result of the measures directed especially against this disease, for many other factors have undoubtedly contributed to it, but I do believe that the very great and rapid fall in the tuberculosis death rate is the direct result of the application of these measures; and I fully believe that the next fifteen years will see a reduction quite equal to that which has already taken place."

All persons having at heart the prevention of tuberculosis will cordially endorse the hope expressed by Dr. Biggs, but looking at the matter from a purely epidemiological standpoint, regret must be entertained that the question of the precise share of the direct preventive measures in promoting an already developed fall in the tuberculosis death-rate has to be left undecided until further light from other places is shed upon the problem.

1911

CHART SHOWING SUCCESS OF VOLUNTARY AND COMPULSORY NOTIFICATION OF PHTHISIS MEASURED BY
NUMBER OF NOTIFICATIONS RECEIVED IN RELATION TO EVERY 100 RECORDED DEATHS FROM THE SAME DISEASE.



N. B. The figures for 1906 are only given for Brighton and Bolton.

CHAPTER IV.

VOLUNTARY AND COMPULSORY NOTIFICATION AS CONTRASTED FROM THE RECORDS OF MANCHESTER, BRIGHTON, LIVERPOOL, SHEFFIELD AND NEW YORK.

It may be of interest to examine the degrees of success, gauged by the number of phthisis notifications alone, which has attended the efforts made in the several places above referred to under the voluntary and compulsory systems respectively; and as some definite standard of comparison is necessary, that employed by Dr. Newsholme in an instructive paper read by him in October, 1906, may be taken, *i.e.*, the number of cases of pulmonary tuberculosis notified in each town in relation to the annual number of deaths certified as due to the same cause. In the paper referred to a diagrammatic form of illustrating the relations was employed, and as there are obvious advantages in such a plan, it is here adopted, subject only to certain modifications and additions. For the most part Dr. Newsholme's figures are dealt with, but as regards New York Dr. Hermann Biggs has supplied the figures for 1904 and 1905, since Dr. Newsholme's diagram was constructed.

It will be seen by the diagram thus constructed that, gauged by the standard adopted, the success *quâ* notification alone, which attended the voluntary system in Brighton during 1903-5 was materially better than that which resulted from the same system either in Manchester or Liverpool. It will be observed, too, that, again on these standards, the Brighton results were during 1904 and 1905 considerably better than those obtained under the compulsory system in vogue in Sheffield during the same two years.

As regards New York the figures show that the results for 1904 and 1905 were materially better than the Brighton results; indeed the New York figures for 1905 are in excess of those for Brighton during 1906.

If, however, the differential study be confined to England alone, it would certainly appear that better results have been secured in Brighton under the voluntary system than were secured in Sheffield during the two years or more of compulsory notification; also it will be seen that, on the standard adopted the Sheffield results are but little better than those obtained in Manchester and Liverpool under a voluntary system.

It should be remembered, however, that the position of Brighton is exceptional in that a large number of the cases notified are invited to reside in the isolation hospital for some five weeks free of charge, an inducement which other towns were not during the periods dealt with in a position to offer.

SUMMARY.

Although, as has been seen, different degrees of advantage seem to have attended notification in the several places referred to, it is difficult so far to demonstrate that the results in any one place as regards an increasing rate of fall in the death-rate curve are such as to lead to a preference for compulsory over voluntary notification, although it would seem that "compulsion" has led to an increase in the number of notifications. It will be seen, however, that both in Liverpool and Brighton, under a voluntary system, the notifications are very materially in excess of the deaths.

A consideration of the data set forth in this chapter relative to the several places wherein some form of notification is in vogue points, indeed, to the very material difficulty which besets any attempt to indicate in the present the effect of notification and of allied measures upon the behaviour of tuberculosis. In almost every place dealt with in this chapter there had been a decrease in the death-rate from pulmonary tuberculosis prior to the introduction of notification, and for this reason it is not practicable to determine how far, if at all, the rate of fall has been influenced by the measures taken.

In this connection it has to be borne in mind that no definite effect is perhaps to be looked for until a lapse of some years from the date of commencement of the notification, and on the other hand is the consideration that except for notification and the preventive measures associated therewith, the death-rate would have risen, *i.e.*, that notification, &c., may have succeeded in maintaining a fall when otherwise the rate would have remained stationary, or even have risen. But against this latter surmise is the fact that the death-rate has in other places fallen in like or even greater amount in the absence of any direct measures whatever.

Similarly, it is conceivable that what may be termed general sanitary and social improvements have now exercised their maximum influence in repression of phthisis, and that if a further reduction in the death-rate curve is to be produced *special* preventive measures such as notification, disinfection, and isolation must be taken. This is, of course, quite a logical position; indeed the data brought forward in this chapter are submitted solely as a preliminary contribution toward solution of the problem. There is, however, one other aspect of the matter which should be referred to. It may be possible that the great attention which has been directed towards tuberculosis in recent years has resulted in a more accurate recognition of the disease, and consequently in better registration of cause of death. This may conceivably have resulted in more deaths from phthisis having been recognised, although the evidence points perhaps rather in the direction of increased accuracy of diagnosis having led to a transference of deaths from "phthisis" to "bronchitis," and thus to a decreasing phthisis death-rate. The whole problem obviously needs further and more detailed study, while in con-

sidering the behaviour of phthisis subsequent to any definite measure, the behaviour of the disease antecedent to its introduction should always be carefully held in view.

The fact that after some five or six years, notification, with its attendant preventive measures, has not been followed by any very obvious or decided results in so far as statistical records are concerned, need not deter other local authorities from adopting a system of notification should they desire to do so, that is to say if they propose to make use of the information thus gained for the purpose of educational precautions as regards special and general hygiene.

The teaching which should ensue upon a well organised system of notification, should result in such an advance as regards cleanliness, fresh air and light in the homes of the patients as to bring about a material improvement in the conditions under which many poor people live, and this should lead to a diminution of all such diseased conditions as depend upon filth, darkness, dampness and defective ventilation. The evidence of Dr. Orme Dudfield as regards voluntary notification in Kensington is that the visits of the female inspector to the invaded houses result in a marked improvement in their general wholesomeness and cleanliness. It is certainly in accordance with expectation, upon the basis of current beliefs as to the means of spread of pulmonary tuberculosis, that notification and the measures arising therefrom should prove necessary steps. In the absence, however, of more convincing evidence as to the value of "compulsory" as compared with voluntary notification, it may perhaps be thought desirable to await further data from Sheffield and Bolton before coming to definite conclusions upon the relative merits of the two methods. The explanation of what may be regarded by some persons as the relative failure of "compulsory" notification is possibly to be found in the fact that it is "compulsory" in a somewhat nominal sense.

It would, however, be a difficult matter administratively to search out cases of phthisis in the same manner as is done with small-pox, and diphtheria, in outbreaks of these diseases and, until this is practicable, a very large number of cases in a relatively advanced phase of the malady must escape detection, whether under a voluntary or compulsory system.

Under any circumstances it will probably be conceded that any compulsory notification introduced should be by means of a special enactment, such as the Legislature has already accepted in the case of Sheffield and Bolton, rather than by classing phthisis along with diseases such as smallpox and diphtheria, and subjecting the thousands of tuberculous subjects to all the disabilities of the Public Health Act for many months or years.

One of the objects claimed for compulsory notification is the protection of the medical practitioner from any legal consequences which might conceivably ensue upon what may be regarded as

the betrayal of the patient's secret ; but it is doubtful whether in practice this has been shown to be at all a material factor. The experience of Brighton and other places where voluntary notification has been attended with a very fair measure of success as regards actual notification would seem to indicate that this fear is not well founded.

Another object of compulsion is to obtain the notification of quite early cases, but there is not, so far as I am aware, much evidence pointing to the conclusion that really early cases are brought to light by this means and it is at least conceivable that if any great disqualification were imposed upon the tuberculous subject from an accentuated idea of danger there might not improbably be some tendency in the direction of suppression both of early and advanced cases, and this question of the possible suppression of cases should always be held in view. The discovery of early cases depends very largely, as Dr. Niven has suggested, upon means being forthcoming to keep the family in comfortable circumstances during the enforced idleness of the patient at a sanatorium or elsewhere. The experience of both Brighton and Manchester tends to the conclusion that when accommodation can be provided at a small or no charge the number of notified cases increases, this being an indication that it is mainly by encouragement and confidence that the best results are likely to be achieved. It has been suggested that the compulsory notification of cases of pulmonary tuberculosis by District Medical Officers and by Medical Officers at Hospitals and Institutions would be instrumental in bringing to light a very large proportion of the cases in which the attention of the officials of the local sanitary authorities would be likely to prove of use, and, as will have been seen, this idea has already been given practical effect to by requests from certain sanitary authorities that only such cases shall be notified as in the opinion of the attending practitioner are likely to benefit by visits from the health officials. In Salford a system has, it appears, been recently introduced in which different coloured cards are to be made use of, the colour indicating whether or not the attendance of the officials is desired. Whatever method be adopted for ascertaining the whereabouts of cases of pulmonary tuberculosis there would seem to be much room for improvement in the machinery for searching out early cases of pulmonary tuberculosis by the light of notified cases, and the more the confidence of the patient is respected the greater will be the likelihood that really early and hopeful cases will be discovered. It is certainly in the interests of the prevention of tuberculosis generally that persons with a reasonable suspicion of the disease should be discovered and treated and it is by this means that a material reduction in the number of "open" and advanced cases may be brought about. In so far as actual prevention of infection is concerned it would not seem necessary to notify "closed" cases, but use should be made of the notification of "open" cases to discover "closed," "latent" or early cases.

With regard to notification generally, the fact that its useful effects are not as yet very apparent, is possibly attributable to the circumstance that, generally speaking, the disease is not notified until the patient is in a more or less advanced stage of the malady, and thus, upon the current views as regards air and dust-borne infection, the major harm, in so far as the immediate personal environment of the patient is concerned, whether in the home or in the workshop, may have been brought about before control from notification has ensued. Moreover, the loopholes attendant upon such control may be so numerous that the opportunities for infection are still considerable. It should be borne in mind in relation to this subject that no human beings, however poor and humble, are anxious to advertise the fact that they are suffering from a malady which the public are beginning to believe is, as regards infectivity, much on a par with small-pox, and hence, a patient suffering from pulmonary tuberculosis may, perhaps, be unwilling to betray the nature of his malady by employing his spitting flask in public. In a crowded tramcar or train or in the workshop or factory there may, in the present condition of public opinion, be inducement for the patient to expectorate in a manner more usual to the class to which he belongs.

In conclusion it seems desirable to add that it would be unreasonable to discontinue or to discourage obviously useful measures, because the effects of such measures may not as yet be statistically apparent. Such action would lead to a total paralysis of much of the undoubtedly useful work which is being performed by local authorities throughout the country.

APPENDIX TO SECTION ON NOTIFICATION,

Compulsory Notification of Tuberculosis.

[Reprint of Section 45, Sheffield Corporation Act, 1903.]

(1.) (a) Every registered medical practitioner attending on or called in to visit any person within the City shall forthwith on becoming aware that such person is suffering from Tuberculosis of the Lung send to the Medical Officer of Health a certificate on a form to be supplied to him gratuitously by the Corporation stating the name age sex and place of residence and employment or occupation (so far as can be reasonably ascertained) of the person so suffering and whether the case occurs in his private practice or in his practice as medical officer of any hospital public body friendly or other society or institution.

Provisions for
Notification of
Tuberculosis
of the Lung.

(b) Any such medical practitioner who fails to give such certificate shall be liable on summary conviction to a fine not exceeding forty shillings.

(c) The Corporation shall pay to every such medical practitioner for each certificate duly sent by him in accordance with this section a fee of two shillings and sixpence if the case occurs in his private practice and of one shilling if the case occurs in his practice as medical officer of any hospital public body friendly or other society or institution.

(d) A payment made to any medical practitioner in pursuance of this section shall not disqualify that practitioner from serving as a

member of the Corporation or as a Guardian of a Union situate wholly or partly in the City or in any municipal or parochial office.

(2.) (a) Where the Medical Officer of Health certifies that the cleansing and disinfecting of any building (including in that term any ship vessel boat tent shed or similar structure used for human habitation) would tend to prevent or check Tuberculosis of the Lung the Town Clerk shall give notice in writing to the owner or occupier of such building that the same or any part thereof will be cleansed and disinfected by the Corporation at the cost of the Corporation unless the owner or occupier of such building informs the Corporation within 24 hours from the receipt of the notice that he will cleanse and disinfect the building or the part thereof to the satisfaction of the Medical Officer of Health within the time to be fixed in the notice. If within 24 hours from the receipt of such notice the owner or occupier of such building has not informed the Corporation as aforesaid or if having so informed the Corporation he fails to have the building or the part thereof disinfected as aforesaid within the time fixed by the notice the building or the part thereof shall be cleansed and disinfected by the officers and at the cost of the Corporation under the superintendence of the Medical Officer of Health. Provided that any such building or part thereof may without any such notice being given as aforesaid but with the consent of the owner or occupier be cleansed and disinfected by the officers of and at the cost of the Corporation under the superintendence of the Medical Officer of Health.

(b) For the purpose of carrying into effect the provisions of this sub-section the Corporation may by any officer authorized in that behalf who shall produce his authority in writing enter on any premises between the hours of ten o'clock in the forenoon and six o'clock in the afternoon.

(c) Every person who shall wilfully obstruct any duly authorised officer of the Corporation in carrying out the provision of this sub-section shall be liable to a penalty not exceeding forty shillings and if the offence is a continuing one to a daily penalty not exceeding twenty shillings.

(3.) (a) The Medical Officer of Health generally empowered by the Corporation in that behalf may by notice in writing require the owner of any household or other articles books things bedding or clothing which have been exposed to the infection of Tuberculosis of the Lung to cause the same to be delivered over to an officer of the Corporation for removal for the purpose of disinfection and any person who fails to comply with such requirement shall be liable on summary conviction to a penalty not exceeding five pounds.

(b) Such articles books things bedding and clothing shall be disinfected by the Corporation and shall be brought back and delivered to the owner free of charge.

(4.) If any person sustains any damage by reason of the exercise by the Corporation of any of the powers of sub-sections (2) and (3) of this section in relation to any matter as to which he is not himself in default full compensation shall be made to such person by the Corporation and the amount of compensation shall be recoverable in and in the case of dispute may be settled by a Petty Sessional Court.

(5.) No provisions contained in any general or local Act of Parliament relating to infectious disease shall apply to Tuberculosis of the Lung or proceedings relating thereto under this section.

(6.) All expenses incurred by the Corporation in carrying into effect the provisions of this section shall be chargeable on the District Fund and General District Rate.

(7.) The Corporation shall cause to be given public notice of the effect of the provisions of this section by advertisement in the local newspapers and by handbills and shall give formal notice thereof by registered post to every medical practitioner in the City and any other registered medical practitioner known to be in practice in the City and

otherwise in such manner as the Corporation think sufficient and this section shall come into operation at such time not being less than one month after the first publication of such an advertisement as aforesaid as the Corporation may fix.

(8.) The provisions of this section shall cease to be in force within the City at the expiration of seven years from the date of the passing of this Act unless they shall have been continued by Act of Parliament or by Provisional Order made by the Local Government Board and confirmed by Parliament which Order the Local Government Board are hereby empowered to make in accordance with the provisions of the Public Health Act 1875.

(9.) The term "Medical Officer of Health" in this section shall mean the Medical Officer of Health for the time being of the City or any person duly authorised to act temporarily as Medical Officer of Health for the City.

NOTIFICATION OF TUBERCULOSIS OF THE LUNG.

SHEFFIELD CORPORATION ACT, 1903. SEC. 45.

CITY OF SHEFFIELD.

To the Medical Officer of Health.

(1) Name in full of person suffering.

(2) Age last birthday.

(3) Number or name of the house and name of street or road where the person is resident.

(4) Chief employment only.

Score out (a) or (b) as the case requires.

I hereby certify and declare, that in my opinion

(1)

a person of the sex, aged (2) years

an inmate of (3)

whose employment or occupation is now or was recently (4)

is suffering from Tuberculosis of the Lung, and that this certificate is granted in regard to

(a) a case occurring in my private practice.

(b) a case occurring in my practice as Medical Officer of a Hospital, Public Body, Friendly or other Society, or Institution.

Dated this

day of
190 .

Signature of Medical Practitioner.

Address of Practitioner.

N.B.—This Certificate must (under a penalty not exceeding Forty Shillings) be sent to the Medical Officer of Health forthwith, on the Medical Practitioner attending on or called in to visit any person within the City, becoming aware that such person is suffering from Tuberculosis of the Lung.

Copy of printed instructions left.

Name

Address

Occupants.—FAMILY: Adults

Children

Medical Attendant, Dr.

called in
of illness

19650

Registration No.

Age

How long?

LODGERS: Adults

Children . Notification received

First

Duration

20

House.—New. About years old. Back to back. Through. Good repair. Clean. Dirty. Dry. Damp. Cellars (Living rooms. Bedrooms. Cellars.) Overcrowded. Well or badly lighted. Large. Small.

Ventilation.—Good. Indifferent. Bad.

Yard.—Private. Common to houses. Condition

Privy W.C.—Inside. Outside. Condition

Drainage.—Surface. Rubble. Pipe. Tested. Not tested. Gullies. Sumps.

Business carried on.—

If contracted in previous houses, state conditions of these.—

Similar illness at this or previous house.—

Family history.—Father's side

Mother's side

Contagion from.—Members of family. Relation. Companion. Workfellow, Character of work and workshop.—

Milk supply.—

Sputum examined.—

Precautions which are being taken.—

Occupants of the House.

Age.		Occupants.	Place of Work or School and Standard.	History.*
M.	F.			

* Now ill.

Notes.

Date of first and subsequent visits.—

(Signed)

Inspector.

TUBERCULOSIS OF THE LUNG.

SUBSEQUENT REPORT BY MEDICAL ATTENDANT ON CASE NOT VISITED BY STAFF OF HEALTH DEPARTMENT.

No. on Register

Name and Address of Patient

- (1) What precautions is patient taking to collect and dispose of spit?
- (2) Is patient generally carrying out the instructions supplied by you?
- (3) Is patient still in an infectious condition?

(Signed)

Signature of Medical Practitioner.

Address

PART IV.

This section of the Report has been introduced to afford information as regards the treatment and prevention of Pulmonary Tuberculosis which is undertaken by the Compulsory Insurance System against Sickness and Incapacity which is in force in Germany and which is regarded by Germans competent to form an opinion as having been such an important factor in promoting the erection of sanatoria and in reducing the death-rate from consumption in Germany. It would seem difficult to over-estimate the social value of this organisation, and as tuberculosis is by common consent very largely a social malady the inter-relation of the two are likely to be of great importance.

An account will also be found in this part of the Report of the results of sanatorium treatment in Germany.

CHAPTER I.

THE BEHAVIOUR OF TUBERCULOSIS IN GERMANY.

1.—*The decline of Tuberculosis in Prussia.*

Very considerable interest attaches to a study of the German tuberculosis statistics, owing to the fact that up to the year 1886 the mortality from this disease in that country remained practically stationary, and that subsequent to this date a decline commenced which has been maintained up to the present time.

The behaviour of tuberculosis in Germany is, perhaps, best studied by the light of the statistics of Prussia, since these figures are regarded as being more reliable than those of the other States; moreover they extend back to 1873. They relate to all forms of tuberculosis and not to pulmonary tuberculosis alone.

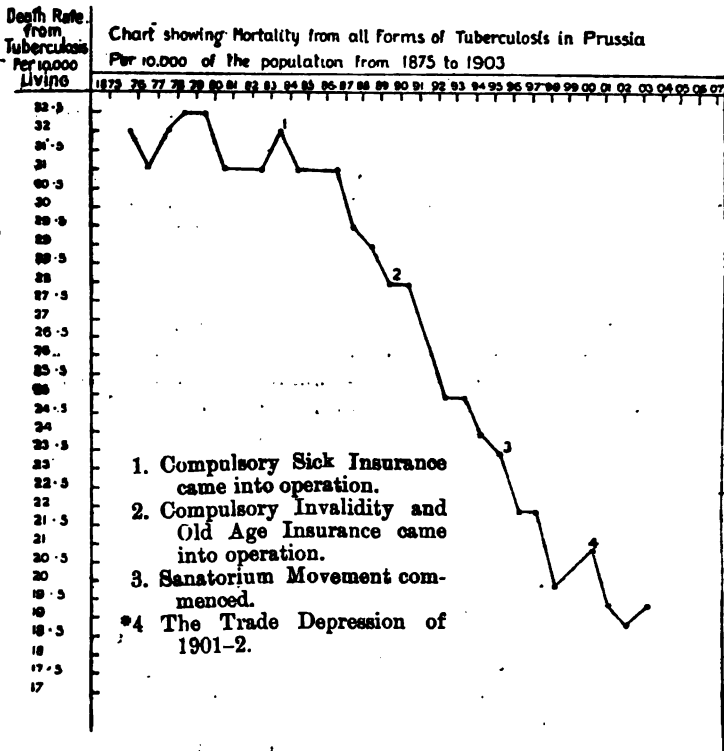
It will be seen by the chart, furnished overleaf, which accompanied an interesting contribution made by Dr. A. Kayserling, of Berlin, to the Tuberculosis Congress in Paris, in 1905,* that up to the year 1886 the tuberculosis mortality in Prussia was either at or above 31 per 10,000 of the population, but that since that date the tuberculosis rate has fallen until in 1905, the last year for which figures are available, it amounted to no more than 19·1 per 10,000.

It is, however, necessary to point out that there are reasons why these figures may not be accepted without hesitation. In the first place it would appear that the causes of death in Prussia are not in all cases certified by medical practitioners; moreover, there are some indications that during recent years there has been transference of deaths from "tuberculosis" to "other maladies of the respiratory organs." For instance, the mortality in Prussia from "other respiratory diseases" has risen from 22·7 per 10,000 in 1886 to 27·0 per 10,000 in 1903. But admitting that the great diminution in tuberculosis mortality above referred to may be accounted for to the extent of 4 per 10,000 by transposal to "other respiratory diseases" consequent upon improved diagnosis, the fact remains that tuberculosis mortality has presumably diminished to the extent of 8 per 10,000 since 1886.

Moreover, it does not appear that the interchange of "tuberculosis" and "other respiratory diseases" in question obtains in the case of the large towns of Prussia. In these the tuberculosis mortality which was 37·36 per 10,000 in 1886 has fallen to 20·36 in 1903, while the mortality for other

* "Les rapports de la tuberculose avec la mortalité en Allemagne," by Dr. A. Kayserling, of Berlin, being a contribution made to a report presented to the Paris Congress on Tuberculosis by the German Central Committee for the erection of Sanatoria for Tuberculosis, and edited by Professor B. Fränkel, of Berlin.

respiratory diseases has fallen from 32.70 to 24.54 in the same period. It is apparently only in these larger towns (over 100,000 population) that the cause of death is, as a matter of routine certified by medical men.



* Added by H. T. Bulstrode.

The fall in both the "all causes" and the tuberculosis mortality in the State, Towns and Rural Districts of Prussia is set forth in the following table, which shows the mortality from "all causes" and from tuberculosis in the Kingdom of Prussia from 1876 to 1901, and it will be observed that up to 1886 the tuberculosis death-rate, whether for State, Towns or Rural Districts was practically at a standstill.

These figures, which are abstracted from Dr. Kayserling's report, are based upon the Census Returns of 1875, 1880, 1885, 1890, 1895, and 1900, and are taken from the official sources. Practically the same statistics were contributed to last Berlin Congress on Tuberculosis in 1902, by the Imperial Statistical Bureau,* and they have been supplemented by the last [volume

* Das Auftreten der Tuberculose als Todesursache in Preussen während der Jahre 1876, 1881, 1886, 1891, 1896 und 1901 (Sonderabdruck aus dem Hefte 179 der "Preussischen Statistik," Berlin, 1902.

of the "Preussischen Statistik," which Mr. G. H. Day kindly procured for me from the library of the Royal Statistical Society.

Deaths per 10,000 of the population.

All Causes.				Tuberculosis.		
Year.	State.	Towns.	Communes.	State.	Towns.	Communes.
1876 ...	255·90	275·62	245·67	30·95	35·81	28·43
1881 ...	249·77	260·93	244·06	30·89	35·23	28·55
1886 ...	261·94	268·81	258·40	31·14	35·50	28·60
1891 ...	229·82	234·00	227·65	26·72	29·75	24·82
1896 ...	209·03	208·02	210·15	22·07	24·57	20·39
1901 ...	206·76	207·60	206·60	19·54	22·38	17·43

The total figures for 1906 are not yet available, but the State rates as regards tuberculosis for 1902 to 1906 were respectively 19·04, 19·64, 19·24, 19·13 and 17·28.

Although the fall in the tuberculosis death-rate indicated in the above table appears to have been generally participated in by all the Prussian towns, such fall was delayed in certain instances, and in some it was not maintained in 1901. For example, the tuberculosis death-rate in Berlin remained stationary until after 1891, while in Breslau the rate which was 53 per 10,000 in 1886, fell to 34 in 1891, and rose again in 1896 to 40, at which rate it still continued in 1901. Among the large towns the smallest rate was recorded for Charlottenburg, *i.e.*, 15 per 10,000, a fall which is possibly to be accounted for by the better social classes occupying that town. As regards Crefeld the fall in the tuberculosis death-rate was so phenomenal as to suggest some special explanation, seeing that it declined from 86 per 10,000 in 1876 to 51 in 1881, 44 in 1886, 33 in 1891, 26 in 1896, and 16 in 1901. The high tuberculosis rates, which obtain in certain of the University towns, such as Berlin and Breslau, is ascribed by the Bureau of Statistics to the large number of persons who come for treatment to these towns from the rural districts. I have been unable as yet to procure later rates for the separate towns.

The Behaviour of Pulmonary Tuberculosis in Saxony.

As the tuberculosis figures with reference to Prussia relate to tuberculosis in all forms, it will be instructive to take those for Saxony, where the rates for pulmonary tuberculosis are separated from those relative to other forms of tuberculosis. The figures

furnished below, which are taken from the official statistics* show that there has been a continuous decline in the death-rate from pulmonary tuberculosis since the quinquennium 1876-80.

Table showing Behaviour of Pulmonary Tuberculosis in Saxony.

Death-rate per 10,000 of the Population.							
Year.				Year.			
1873-75				1896-1900			
1876-80				1901			
1881-85				1902			
1886-90				1903			
1891-95				1904			

Death-rate from Pulmonary Tuberculosis per 10,000 in certain groups of towns.

—	1900.	1901.	1902.	1903.	1904.
Towns with population of 8,000 and over.	22.1	18.7	17.3	18.5	17.3
Small towns and villages ...	16.9	15.1	12.4	13.8	12.2
In the whole country ...	19.0	16.8	15.8	14.6	14.5

The decline indicated in the foregoing pages from tuberculosis in Germany as a whole is attributed by the Germans in the main to two factors. In the first place to the organisation of the Workmen's Compulsory Insurance system, and secondly to the discovery of the tubercle bacillus in 1882.

As regards the first of these influences, it has to be observed that the insurance against "sickness" commenced in 1884, and that such insurance embraced a million of workmen, and that in 1890 the insurance against "invalidity," came into operation, by which means some 13 millions of the working classes became insured against "invalidity," i.e., against sustained physical disability caused by illness.

* Sechsenddreissigster Jahresbericht des Königl. Landes-Medizinal-Kollegiums über das Medizinalwesen im Königreiche Sachsen auf das Jahr 1904.

Later, in 1896, the sanatorium movement commenced, and the increase in the number of beds provided since that date is shown below :—

						Beds.
At the end of the year	1896	...	...	...	...	750
"	"	1900	...	...	...	3,700
"	"	1904	...	...	...	6,500

At the beginning of 1907 there were in Germany 87 popular sanatoria with 8,422 beds (5,472 for males, 2,658 for females and 292 for either sex). There were, in addition, 35 private sanatoria with 2,118 beds, 17 sanatoria for tuberculous children with 650 beds and 67 establishments, with 6,092 beds for children suffering from scrofulous and similar conditions. Eleven popular sanatoria, with some 800 beds in all, were in course of erection.

In the next chapter some account of this insurance system above referred to will be furnished, which will serve further to explain the chart on page 614, where figures have been inserted indicating the date at which the insurance measures and the sanatorium movement came into operation, as also the date of the trade depression of 1901-2.

As regards the influence of the discovery of the tubercle bacillus in promoting the decreased death-rate, it has to be pointed out that although in Germany such death-rate commenced to fall some four years after the discovery of the bacillus was announced, the death-rate from the disease had, in England and many other countries, been steadily decreasing prior to such discovery. I have elsewhere* adduced a considerable amount of evidence tending to the conclusion that in England and elsewhere the death-rate from pulmonary tuberculosis was decreasing at a greater rate before the discovery of the bacillus than has been the case since. Whatever may have been the influence of this discovery in Germany, there is, so far, little or no evidence to show that in other countries it has hastened the decline of the disease, in so far, at least, as can be gauged by the death-rate.

* *Lancet*, July 25, 1903.

CHAPTER II.

**THE COMPULSORY INSURANCE AGAINST SICKNESS AND
INVALIDITY IN THE GERMAN EMPIRE, AND THE
BEARING OF SUCH INSURANCE UPON THE CURE AND
PREVENTION OF PULMONARY TUBERCULOSIS.**

This subject is here introduced because, it appears to be very intimately connected with the problem of the prevention and treatment of tuberculosis among the working classes, and for the reason that I wish particularly to invite special attention to this aspect of the question.

In the following summary of the German Insurance Laws, I am indebted mainly to the several papers referred to in the foot-notes below, and I have derived assistance more particularly from contributions made to various congresses by Herr Bielefeldt, Imperial Councillor and President of the Senate in the Imperial Assurance Office.*

The vast network of the Compulsory Insurance of the working classes which is in operation to-day in Germany owes its origin to the following memorable message which was sent to the Reichstag, on November 17th, 1881, by the Emperor William I., and which was communicated to the assembly by the Imperial Chancellor, Prince Bismarck.

“We consider it our Imperial duty to impress upon the Reichstag the necessity of furthering the welfare of the working people. We should view with increased satisfaction the manifold successes with which The Lord has blessed our reign, could we carry with us to the grave the consciousness of having given our country an additional and

*1. Guide to the Workmen's Insurance of the German Empire. Revised edition brought up to date for the International Exhibition of Paris, 1900.

2. The Results of the Workmen's Insurance of the German Empire. Compiled for the Paris International Exhibition, 1900, at the request of the Imperial Insurance Office, by G. A. Klein, L.D., Imperial Councillor and permanent Member of the Imperial Insurance Office. Berlin. A. Asher & Co.

3. The Battle against Consumption as a Sicknens of the People, by means of the German Workmen's Insurance, by Imperial Councillor Bielefeldt, President of the Senate in the Imperial Insurance Department. A Paper contributed to Section I of the Tuberculosis Congress of London, 1901.

4. Assurance Ouvrière et Tuberculose, by the same author. A Paper contributed to the Tuberculosis Congress of Paris, 1905.

5. Progress of the German Working Classes, by W. J. Ashley, Professor of Commerce in Birmingham University. Longmans, Green & Co., 1904.

6. Industrial Efficiency. A Comparative Study of Industrial Life in England, Germany, and America, by Arthur Shadwell, M.A., M.D. Longmans, Green & Co., 1906.

7. The German Workman. A Study in National Efficiency, by William Harbutt Dawson. P. S. King & Son, 1906.

8. Life and Labour in Germany, by the Gainsborough Commission, with an Appendix on Infirmary and Old Age Pensions in Germany, by J. L. Bashford, M.A. Simpkin, Marshall, Limited, London, 1907.

lasting assurance of internal peace, and the conviction that we have rendered the needy that assistance to which they are *justly entitled*. Our efforts in this direction are certain of the approval of all the federate Governments, and we confidently rely on the support of the Reichstag without distinction of parties. In order to realise these views, a Bill for the Insurance of Workmen against Industrial Accidents will first of all be laid before you, after which a supplementary measure will be submitted, providing for a general organisation of Industrial Sick Relief Insurance. But likewise, those who are disabled in consequence of old age and invalidity possess a well-founded claim to a more ample relief on the part of the State than they have hitherto enjoyed."

"To devise the fittest ways and means for making such provision, however difficult, is one of the highest obligations of every community based upon the moral foundations of Christianity. A more intimate connection with the actual capabilities of the people and a mode of turning these to account as corporate associations under the patronage and with the aid of the State, will, we trust, develop a scheme to solve which the State alone would prove unequal."

The practical outcome of this message has been that the German working man is no longer compelled to rely upon public charity in case of illness; he has a legal right to a substantial provision when he becomes unfitted for work by reason of sickness, accident, invalidity or old age.

There are now in force in Germany three groups of compulsory insurances.

1. *Accident Insurance (came into force July 6th, 1884) :—*

Provided for by payments from ... Employers only.

2. *Sickness Insurance (came into force December 1st, 1884) :—*

Provided for by payments from ... { Workmen, 2/3rds.
Employers, 1/3rd.

3. *Invalidity and Old Age Insurance (came into force in the first instance, January, 1891) :—*

Provided for by payments from ... { Workmen.
Employers.
Empire.

As regards this latter group, it may be mentioned that the workmen and the employer contribute in equal shares, and that the Empire subscribes to each annuity, when it is realised, the fixed amount of £2 10s. per annum. The Empire pays, too, the personal contribution of the workman while he is serving in the Army or in the Navy, and also defrays the expenses of the Imperial Insurance Department. It effects gratuitously, as is the case with the Accident Insurance, the payment of pensions through the post offices.

For the purposes particularly in view it is only necessary to discuss here the Sickness and Invalidity (with old age) Insurances, and I propose in the first instance to describe briefly these organisations, dealing later with the manner in which they are regarded by the Germans as aiding in the battle against tuberculosis.

SICKNESS INSURANCE (INTRODUCED IN 1884).

The first Sickness Insurance law, which is dated 15th June 1883, came into operation in 1884, but a supplementary measure was brought into force in January 1893, with the view of bringing Sickness Insurance into harmony with the Invalidity Insurance which had been introduced in the meantime. The Sickness Insurance now subjects to compulsory insurance, all workmen over sixteen years of age who are employed in mines, quarries, factories or other industrial concerns, as also managing officials, provided that in all cases the annual earnings do not exceed £100.

The law also permits the voluntary establishment of statutory obligations of insurance in parishes or townships for workers in certain home industries, and groups of agricultural labourers, where the conditions are purely local in character. By the measure of 1893 certain groups of clerks are brought under the scope of compulsory insurance. It has, too, to be added that persons not included in the above categories, but whose incomes are under £100 per annum may voluntarily enjoy the privilege of participating in the statutory insurance provisions.

The fundamental condition of compulsory insurance is dependence upon the fact of having an employer, persons carrying on business of their own being generally exempt.

The Sick Insurance is carried out by local organisation in order that the relief, which to be efficacious must be prompt, may be forthcoming without delay, and with a view to facilitating administration certain obligatory sick-associations were established, which are linked together in such a fashion as to afford opportunities for the interchange of membership by persons removing from one district to another.

The following sick associations have been authorised by statute, but there are also still in existence voluntary sick clubs which everyone is at liberty to join.

1. Local sick clubs established by parishes for local trades.
2. Factory (industrial) sick clubs established by factory owners.
3. Builders' sick clubs established by building contractors.
4. Guild sick clubs founded under the German Trades Regulation Law.
5. Miners' sick clubs established under the mining laws of the several German States.

The object of this Sick Insurance is to secure to the insured a certain and adequate relief in case of illness during at least 13 weeks, the minimum of relief to which all the insured have a legal claim comprising the following :—

1. Free medical attendance and medicine as also, where necessary, spectacles, trusses, bandages, &c.
2. In case of incapacity for work, a daily sick pay (after a *Wartezeit* of two days) amounting to half the daily wages upon which the contributions have been calculated, or, in certain cases, free admittance to hospital, together with half the sick pay for the patient's family.

In addition to the above the assurance guarantees—

3. Burial money amounting to twenty times the average daily wages.
4. Sick relief to women during four weeks after confinement.

Under certain circumstances the insurance associations have the power to extend materially the above grants, both as regards amount and duration.

The contributions of the insured are limited to from 2-3 per cent. of the average daily wages of that class of workmen to which the club relates.

As regards the actual payments the employer must, when depositing the contributions of the workman, himself pay a sum equal to one-half of such contributions, *i.e.*, two-thirds of the whole are furnished by the workman and one-third by the employer. (The State makes no contribution to Sickness Insurance.)

An exact illustration will tend to make clearer the general provisions.

An insured workman having a weekly wage of 24*s.* pays 6*d.* weekly towards the insurance fund. In case of sickness he receives 12*s.* per week, together with free medical attendance and medicine. In the event of death the burial money would amount to £3 18*s.* In addition to these rights gratuitous medical attendance is frequently granted to the family.

INVALIDITY (INFIRMITY) AND OLD AGE INSURANCE (FIRST CAME INTO FORCE IN 1891.)

The object of this branch of the Insurance system is to secure to persons employed for wages or a certain minimum salary, a legal provision under circumstances not provided for by the Sickness and Accident Insurance laws, the statute governing this branch of the system being the Invalidity Insurance Act of July 13th, 1899, which came into operation at the beginning of 1900, and which improved and extended the provisions of the Invalidity and Old Age Insurance Act of June 22nd, 1889 which came into force January 1st, 1891.

The system of Invalidity Insurance now in compulsory operation arose out of the fact that an analysis of the invalidity statistics showed that of all male workers engaged in mining, metallurgy and building who became invalided before 30 years of age, more than 50 per cent. suffered from pulmonary tuberculosis, and that the figures for females were practically identical.

Before, however, dealing with the manner in which the Invalidity Insurance system bears upon the question of the treatment and prevention of tuberculosis, it will be desirable to indicate briefly the classes to which this insurance applies.

The Invalidity Insurance Act now in operation subjects to compulsory insurance all persons who have completed their sixteenth year, and whose regular yearly earnings do not exceed 2,000 marks (nearly £100), provided that they belong to one or another of the following groups of individuals :—

1. All persons working for wages in every branch of trade ; apprentices and servants included.
2. Managing officials (foremen and engineers, &c.), commercial assistants (clerks and apprentices) and other employés (such as ship's captains) as well as teachers and tutors, provided that in all cases their earnings do not exceed £100 per annum.

By order of the Bundesrath obligation to insure may be extended to :

Small employers (with only one assistant workman) and home industries (irrespective of the number of hands employed).

Although the scope of the compulsory obligation may be thus extended by an order of the Bundesrath, the only extension which had taken place up to 1900 was in relation to home-workers in the tobacco and certain branches of the textile industry.

Persons belonging to the following groups are allowed voluntarily to join the Invalidity Insurance System up to their fortieth year of age :—

1. All employés with yearly earnings of £100-£150.
2. Small employers (with only two regular workmen) and home-workers so far as they are not already subject to compulsory insurance.
3. Persons who are exempt from compulsory insurance in consequence of their working only occasionally or for maintenance alone (bread and clothing).

Persons who by virtue of an increased income are no longer compelled to insure, and persons whose insurance has lapsed from non-payment of the contributions have the right, under certain specified conditions, to continue or to renew their insurance.

The following persons are exempt from compulsory insurance :—

1. Officials of the Empire, Federal, State and Provincial Administrations as well as teachers and tutors while training at the public schools and institutions for their future calling, and who may reasonably expect to receive eventually a pension equal to the lowest invalid pension.
2. Soldiers who are employed as workmen.
3. Officials of the Insurance and other institutions who are entitled to a pension.
4. Persons giving instruction for remuneration during their term of study.
5. Infirm persons who are already entitled to an invalidity pension or whose capacity for work is permanently reduced to less than one-third by old age, sickness, or other infirmity.
6. Persons who receive only free maintenance (home and clothing) in lieu of wages, or who are exempt (by order of the Bundesrath) from compulsory insurance as only occasional workers.

The funds necessary to maintain this system of invalidity and old age insurance are contributed to jointly by the Empire, the employers and the employed. The Empire contributes the fixed amount of £2 10s. to each annuity, and it also pays the weekly contribution of the workman while serving in the Army and Navy. It defrays the expenses of the Imperial Insurance Department and effects, gratuitously, the payment of pensions through the post offices.

All the other expenses are borne in equal shares by the insured and their employers and are raised by current contributions.

The contributions must be made weekly, and in the case of the compulsory insurances the contributions are, as a rule, paid by the employers, who purchase stamps of definite value at the local insurance offices and affix them to the receipt card of the insured. The employer is then entitled when paying the wages of the insured to deduct an amount equal to one-half of the contribution.

In the case of persons who join the system voluntarily or who renew a lapsed insurance, the full contribution has to be made by the insured, there being presumably no assistance from either the employer or the Empire.

In order that the amount of the contributions and of the pension may be systematically arranged according to the annual income of the insurer, the insured have been divided into five wage-earning classes :—

Class				£	s.	d.
I.,	earning annually up to...			17	10	0
"	II.,	"	"	27	10	0
"	III.,	"	"	42	10	0
"	IV.,	"	"	57	10	0
"	V.,	"	above	57	10	0

Each of these classes pays a definite amount weekly as arranged by the Bundesrath and approved by the Reichstag.

The following weekly contributions have been fixed for the period ended December 31, 1910 :—

Class	I.	...	...	14 pfennigs weekly.
"	II.	...	...	20 " "
"	III.	...	...	24 " "
"	IV.	...	...	30 " "
"	V.	...	...	36 " "

and the invalidity pension to such persons consists—

- (a) Of the State subsidy of 50 marks (£2 10s.).
- (b) Of an *initial* or *fundamental* sum according to the wage-earning class in question, *i.e.*, in marks, Class I., £3; Class II., £3 10s.; Class III., £4; Class IV., £4 10s.; and Class V., £5.
- (c) Increasing sums corresponding to the number of weeks for which contributions have been made.

No pensions are payable until 200 weekly contributions have been made, but after that time the minimum annuities are as follows :—

					£	s.	d.
In Class	I.	...	...	...	5	16	4
"	II.	...	...	...	6	6	0
"	III.	...	...	...	6	14	4
"	IV.	...	...	...	7	2	2
"	V.	...	...	...	7	10	0

The pensions continue to increase according to the number of weekly contributions that have been made, until, at the end of 50 years or 2,500 weekly contributions have been made, the payments reach the following maxima :—

					£	s.	d.
Class	I.	...	...	...	9	5	4
"	II.	...	...	...	13	10	0
"	III.	...	...	...	16	10	0
"	IV.	...	...	...	19	0	0
"	V.	...	...	...	22	10	0

It is necessary to point out that in the event of at least 200 weekly contributions having been made the amounts contributed by the insured are refunded under the following circumstances :—

1. If a woman marries before obtaining an annuity her contributions are returned to her.
2. If insured persons die before the annuity becomes attainable their contributions are given to the survivors.
3. If persons are invalided by accident and their invalidity from this cause is covered by the accident insurance.

Finally, and this is the provision which particularly affects the question of tuberculosis, sick relief (with assistance to the family) may be granted to insured persons if, as the result of the illness, a claim for an invalid pension in consequence of sustained incapacity for employment is to be apprehended.

As in the case of the Sickness Insurance I furnish here an illustration of the advantages accruing under the Invalidity Insurance.

A workman with an annual income of £58 16s. pays weekly contributions of 2d., *i.e.*, about 8s. 6d. yearly; his employer pays an equal amount. In case of sustained incapacity for work the Invalidity pension of the workman—according as to whether his age is 26, 46 or 66—amounts to £10 6d., £16 4s. and £22 1s., assuming, of course, that his contributions have been regularly paid for 10, 30 or 50 years, and that he has since his 16th year uninterruptedly followed a vocation in which insurance is compulsory.

A working woman earning £15 14s. annually pays about 1d. per week, and she would receive an invalid pension of from £6 3s. to £9 1s., according to the number of her contributions.

When a claim for a pension has been made by one of the insured the local Directing Board issues an approving or rejecting "notice" in writing. Against an unfavourable decision it is competent for the insured to appeal within a month to the Arbitration Court, which is composed equally of representatives of the employer and the employed, and, further, if either party is dissatisfied with the decision of this Court appeal may be made within a month to the Imperial Insurance Department.

It will have been apprehended that the conditions afforded to the workers by the provisions as to invalidity and old age above set forth are far more favourable in so far as the workers are concerned than could be procured by any private insurance office, seeing that not only does the insured procure the employers' subsidy, but also the Imperial subsidy of £2 10s. per annum. It is, in fact, clear that without the co-operation of the employer and of the Empire the system in its entirety would be impracticable. For instance, after 200 weekly payments have been made the amount of the yearly invalid pension in Class II. is more than six times the amount of all the contributions paid by the insured.

The foregoing details are set out in a concise form on the following page.

TABLE SHOWING THE WORKING OF THE INVALIDITY AND OLD AGE PENSION SCHEMES.

Form of the Provision made.	Its Extent.	Its Organisation.	Contributions to be paid.	Benefits secured.	Settlement of Disputes.
Insurance compulsory for	<p>{ All wage-workers and employés with salaries up to £100.</p> <p>{ Small masters and home-workers by order of the Bundesarth.</p>	<p>Territorial insurance Institutions (based on mutuality and self-administration).</p> <p>In addition, special organisation for railways and mines.</p>	<p>Equal weekly premiums by employés and employer.</p> <p>State subsidy of 50/- per annuity.</p>	<p>(a) Pension for invalids after 200 weekly contributions.</p> <p>(b) Old age pension for septuagenarians after 1200 weekly contributions.</p> <p>(c) Free treatment with relief to family in order to prevent invalidity.</p> <p>(d) Beibursament (after 200 weekly contributions) of contributions in case of death or marriage before pension obtainable.</p>	<p>Free.</p> <p>Arbitration Court of Imperial Insurance Department, with equal representation of employés and employer.</p>
Insurance voluntary for	Workmen, employés, small masters (not obliged to insure).				

And the contributions, pensions, &c., paid year by year, from 1891-1905, are set forth in the table furnished below, which is taken from a report made by Mr. J. L. Bashford in "Life and Labour in Germany." The figures have, Mr. Bashford adds, been revised by His Excellency Count Posadowsky.

Old Age and Infirmary Insurance.—Revenue and Amount of Pensions, 1891-1906.

Year.	Revenue.			Pensions.			Con- tributions Returned.	Medical Assis- tances.	Home Relief for Infirm Women.
	Contributions.		Subvention of Empire.	Interest, &c.	Old Age Pensions.				
	Employers.	Employed.			Infirmary Pensions.	Sick Pensions.			
1891	£ 2,302,258	£ 2,302,258	£ 296,561	£ 39,016	£ 66	£ 750,000	£ —	£ 18	£ —
1892	2,344,186	2,344,186	443,195	191,655	65,606	1,050,657	—	1,560	—
1893	2,375,220	2,375,220	555,730	326,010	255,250	1,113,020	—	5,310	—
1894	2,451,854	2,451,854	682,510	497,201	491,759	1,197,035	—	17,870	—
1895	2,468,650	2,468,650	830,058	657,074	751,607	1,298,860	10,752	30,970	10,752
1896	2,674,892	2,674,892	942,756	777,321	1,021,800	1,339,538	96,826	57,622	96,826
1897	2,765,010	2,765,010	1,070,435	901,632	1,326,565	1,350,782	166,222	92,431	166,222
1898	2,890,984	2,890,984	1,195,128	1,039,731	1,684,478	1,345,586	220,464	128,909	220,464
1899	3,119,191	3,119,191	1,328,845	1,176,541	2,076,885	1,314,978	267,000	196,885	267,000
1900	3,156,137	3,156,137	1,507,930	1,066,796	2,626,134	1,285,500	324,550	273,443	324,550
1901	3,304,252	3,304,252	1,660,390	1,511,808	3,187,338	1,208,614	339,470	349,541	339,470
1902	3,406,514	3,406,514	1,855,377	1,658,904	3,851,272	1,152,317	349,710	443,656	349,710
1903	3,585,209	3,585,209	2,051,702	1,793,653	4,548,811	1,083,976	370,369	485,462	370,369
1904	3,776,662	3,776,662	2,219,390	1,918,489	5,164,028	1,022,953	385,204	534,727	385,204
1905	3,953,231	3,953,231	2,321,119	2,042,609	5,602,316	954,757	400,566	596,018	400,566

The advantage obtained by the German working classes by means of the several insurance systems that have been described may be gathered from the following figures, which represent the sums paid from 1885 to 1903 by all sickness-banks in Germany.

	£.
1. Sickness indemnity to member of banks	49,520,542
2. Assistance to the families of workmen under treatment in hospital.	905,458
3. Assistance to lying-in women	1,612,698
4. Payments in connection with deaths	3,859,425
Total	55,898,123

The following sums were paid from 1891 to 1903 by all the Insurance Societies in Germany.

	£.
Invalid's allowance	22,325,266
Sickness "	300,039
Old age "	15,780,207
Reimbursements in cases of marriage	1,624,145
" " " accidents (from 1900 only)	5,593
" " " deaths	558,295
Assistance to the families of the assured during their sojourn in hospitals, sanatoria, &c., from 1897-1903.	183,967
Total	40,777,512

In summarising the results of this vast insurance system, Herr Bielefeldt points out, that it is mainly the workmen, whose capacity for work is more or less reduced, who benefit by the sums referred to in the foregoing tables.

As he observes, without this workmen's insurance system the great majority of cases of sickness, invalidity and old age would bring about poverty, misery and economic ruin. For the earnings of the workman (in Germany) only suffice as a general rule for the demands of every day existence: they do not suffice for the exceptional cases where the activity of the breadwinner ceases temporarily or permanently. Although the workman is at liberty to profit by private insurance the mass of the working classes do not for various reasons thus insure. "The pecuniary assistance afforded by the German workmen's insurance prevents the workman from falling at the mercy of public assistance, which is always imperfect, at a time when his powers do not suffice for the support of his family. It keeps the patient from invalidity and his family from poverty, and does not allow

strength already enfeebled by sickness and suffering from still further deterioration owing to insufficiency of food."

The misery and the privations consequent upon many illnesses often engender others, and particularly tuberculosis. Illness alone cannot ruin a German workman's family, since the insurance guarantees the most essential means of existence to the working man struck down by incapacity for work.

Moreover, beyond the general effect of insurance in favouring the vital resistance of the working classes to tuberculosis its influence is further manifested, both as regards the treatment of the insured, and through the agency of persons discharged from sanatoria who spread a knowledge of prophylactic measures among their fellows.

It will be instructive to follow Herr Bielefeldt in his further discussion of the German Insurance system in its application to tuberculosis.

I.—THE MANNER IN WHICH SICKNESS INSURANCE INFLUENCES THE TREATMENT OF TUBERCULOSIS.

The Sickness Insurance concerns itself, both with the cure and the improvement of the working man afflicted with tuberculosis, in that it guarantees medical treatment and drugs, &c., through the channel of the local Sickness Banks, which secure for their members the necessary medical assistance. In the earlier days of their existence, these banks concerned themselves overmuch with economy, but they have now recognised that it is in the interest alike of the banks and their members to promote rapid, efficacious and consecutive treatment. With this end in view they have increased the number of their medical advisers, and have engaged, amongst other experts, persons who have devoted special attention to the subject of tuberculosis. It is, Herr Bielefeldt tells us, the influence of the medical man which has brought about from year to year a progressive advance, so that the insured are able to-day to profit by all the discoveries of modern medicine.

Moreover the Sickness Banks are able to provide their members with certain forms of food, such as milk, cocoa, &c., while in the case of persons who are very seriously ill, they supply gratuitously the services of nurses.

They can also, with or without the consent of the patient, send him for treatment to a hospital or to a clinic, the bank's committee having the power, but being under no statutory obligation to do this. The committee have also the right to transfer a patient to a special hospital where the illness for one cause or another calls for special treatment, and it has long since been recognised that certain illnesses, of which tuberculosis is one, are placed under

much more favourable conditions as regards cure at hospitals or sanatoria than in the home.

In order to facilitate operations in this sense, arrangements are made by the banks with hospitals, clinics, sanatoria, &c., which enable the varying needs of the patients to be at once supplied.

The crusade against tuberculosis has, too, found a powerful ally in the so-called "Air-Cure Establishments," in league with the banks. These are places situated in the pure forest air and are furnished with a barrack serving as a buffet, a shelter and a portable water fountain. There are provided chairs, seats, tables and toilet accessories, blankets and spittoons, and a few beds for cases of serious and sudden illness. The supervision of these establishments, which are, as a rule only open during the day and in summer, is entrusted to a sister. At one of these stations, near Berlin, which is for men only, a successful trial has been made during the winter months.

The greater number of persons who daily frequent these establishments are sent at the expense of the Sickness Banks, and they are able to procure, either cheaply or gratuitously, milk, simple meals and, sometimes, the diet prescribed by the doctor. The patients are for the most part tuberculous subjects unable to obtain admission into a sanatorium either by reason of there being no beds available or from the fact of their illness being too advanced.

The "air-cure" establishments near Berlin have been patronised in an increasing degree from year to year, owing partly to their popularity and partly to an increase in the number of stations.

In 1900	there were recorded	12,011	day attendances.
" 1901	" " "	28,914	" "
" 1902	" " "	67,626	" "
" 1903	" " "	92,231	" "
" 1904	" " "	132,963	" "
		<hr/>	
		333,745	
		<hr/>	

The majority of the persons who have attended these stations have gained materially in weight.

Subventions to Convalescents.

By the provisions of the statutes governing the sickness insurance, the banks are able to grant certain subventions to convalescents after the expiration (13 weeks) of the sickness insurance payments, and these subventions may be made payable, if necessary, for one year. Such subventions take the form of a stay at convalescent homes or other places in the country. These additional advantages are granted convalescents who have suffered from some severe illness of the lungs, heart or other

organs and who need prolonged rest. The utility of this practice in rendering the subject less susceptible to tuberculosis is obvious.

II.—THE MANNER IN WHICH INVALIDITY INSURANCE INFLUENCES THE TREATMENT OF TUBERCULOSIS.

The effect of the above sickness-insurance in aiding the battle against tuberculosis is obviously very material, but it is small compared with the influence in the same direction of the invalidity insurance, the organisations of which are clearly interested in preventing or diminishing conditions of invalidity which raise claims to pensions. Although the means employed with this view by the invalidity insurance constitute merely a subsidiary part of its general functions, it is not less true that "the organisations of this insurance have become the main and essential basis of all efforts making for the improvement of the public health, owing largely to the material interest which this institution has in prolonging as much as possible the working capacity of the assured."

By the provisions of the Invalidity Insurance law the agents of this association are able to defray the expenses of the medical treatment of the assured when the onset or the continuance of invalidity is to be feared in consequence of a given illness. If the patient be a member of a sick bank the invalidity insurance is under the obligation, having once taken the case in hand, to procure to the insured advantages at least equal to those which would have legally accrued to him as member of the sickness-bank, i.e., medical treatment, medicine, sick pay and the usual subvention to the family. It is merely the amount of subvention or indemnity which varies according as the patient has or has not been insured against sickness up to the time when the Invalidity Insurance takes over the treatment. While in the first place the subvention to the family amounts to half the sickness indemnity due to the assured, in the second case the patient has only a right to an indemnity equivalent to a quarter of his usual salary.

But if the resources admit of it the subvention can be, and in practice often is, increased by the Invalidity Authority to double the minimum amount, since it is fully appreciated that when the subvention to the family of the tuberculous subject is insufficient the patients tend to leave the sanatorium before the end of the treatment, with the result that the improvement in their health is rapidly lost.

The essential condition for being treated at the expense of the Invalidity Insurance is insurance in conformity with the Invalidity Insurance law, whether under its obligatory or voluntary provisions: it is not necessary to await the expiration of the interval which legally entitles an insured person to invalidity pension in order that he may obtain medical treatment at the expense of the

Invalidity Insurance. This is of importance from the standpoint of the prevention of tuberculosis.

As already indicated, this intervention in a curative sense of the Invalidity Insurance is undertaken with the object of preventing the pension claims from becoming too heavy ; for the Invalidity Insurance is directly concerned in promoting the cessation of an already existing sickness, the cost of the pension being more onerous for it than the expense of treatment.

According to the statistical returns of the Imperial Insurance Office for the period 1891-1895, which embraced 158,462 persons entitled to pensions, it appeared that of workmen in mines, blast furnaces, and in building trades, who had become invalided before the age of 30, more than one-half suffered from tuberculosis ; a like unfavourable proportion of tuberculosis invalidity was yielded among female workers at the same occupations, aged 20-24 years and entitled to pensions, while between 25-29 years of age nearly half the females invalided became so on account of tuberculosis. Agricultural and forest labourers became more rarely invalided by tuberculosis, though among agricultural labourers invalided between 20-24 years, as many as 354 out of 1,000 were tuberculous. In all the other occupations of 1,000 cases of invalidity between 20-36 years of age, 456 were due to tuberculosis, while only about 250 per 1,000 amongst females similarly grouped were tuberculous.

According to more recent statistics, which relate to 315,089 persons entitled to pensions, and which bring the figures up to 1899, the ravages of tuberculosis would appear to be even worse than those suggested by the figures given above.

Consequently, the German Invalidity Insurance resolved to attempt to arrest the evils of tuberculosis by a great variety of measures, and in this way the organisations of the Invalidity Insurance have become since 1895, according to Herr Bielefeldt, the centre of the anti-tuberculosis movement in Germany.

The following table shows the number of males and females treated year by year since 1897.

Year.			Males.	Days of Treatment.	Females.	Days of Treatment.
1897	...	...	2,598	189,218	736	63,678
1898	...	...	3,806	278,643	1,104	91,291
1899	...	...	6,032	440,871	1,666	131,343
1900	...	...	8,442	610,687	2,652	212,650
1901	...	...	10,812	781,200	3,844	314,207
1902	...	...	12,187	898,206	4,302	350,967
1903	...	...	14,937	1,107,793	5,211	431,115
1904	...	...	16,957	1,265,437	6,520	520,497
Total			75,771	5,572,055	26,035	2,115,748

The duration of treatment has ranged amongst males from 72-75, and amongst females from 79-87 days.

It will be instructive at this stage to furnish the figures relative to the annual cost of the treatment above referred to.

—	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.
For the treatment of a tuberculous male ..	285'24	307'60	310'31	345'13	348'68	380'20	375'84	375'91
For the treatment of a tuberculous female ..	340'83	340'96	318'04	321'12	320'34	341'43	350'80	327'28

The daily cost per head was as follows :—

—	1897.	1898.	1899.	1900.	1901.	1902.	1903.	1904.
	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.	Marks.
For males	4'06	4'20	4'26	4'78	4'83	4'89	5'04	5'01
For females	4'04	4'12	4'03	4'01	4'03	4'19	4'23	4'10

The Invalidity Insurance is able to afford to the assured all the methods of treatment which may be necessary, no matter for what form of illness. It can place at their disposal special hospitals and institutions, sanatoria, air-cures, convalescent homes, mud baths, &c., and the extensive use which was made of this power in favour of tuberculous subjects during the years 1898 to 1904 may be gathered from the following Table.

STATISTICS RELATIVE TO THE NUMBER OF TUBERCULOUS MEMBERS OF THE INVALIDITY INSURANCE WHO HAVE RECEIVED DURING 1898-1904 THE DIFFERENT FORMS OF TREATMENT PLACED AT THEIR DISPOSAL BY THE WORKMEN'S INSURANCE BANKS.

Nature of Treatment.	1898.	1899.	1900.	1901.	1902.	1903.	1904.	Total.
Hospitals (clinics, &c.):—								
Males	273	349	522	349	334	318	309	2,454
Females	51	88	131	132	187	242	312	1,143
Sanatoria and climatic stations:—								
Males	3,089	4,998	6,892	8,756	10,759	13,196	15,239	62,916
Females	889	1,310	2,060	3,058	3,358	4,266	5,386	20,297
Convalescent homes:—								
Males	66	35	22	72	117	335	596	1,243
Females	23	21	8	53	135	164	375	779
Bathing stations:—								
Males	366	632	976	1,611	963	1,074	816	6,428
Females	157	241	455	595	612	521	447	3,028
Private institutions:—								
Males	8	23	27	15	23	14	7	117
Females	1	6	8	6	7	18	—	46

In view of the enormous expenditure thus involved, an attempt has been made to ascertain, so far as may be practicable, whether the results of this anti-tuberculous treatment fulfil the anticipations, and whether there is justification for the money expended. With the object of solving this problem the Imperial Insurance Office has since 1897 proceeded to make enquiries as to the persons who had undergone treatment during five successive years, and an annual investigation has been made with the view of ascertaining whether the persons regarded as having been successfully treated have fallen in the meantime into "invalidity" or have died.

It is of importance to add that in practice all cases insusceptible of improvement are discharged from the sanatoria, often at the end of a few days' observation or trial, and such cases are regarded in this investigation as unsuccessful, while cases which have by chance escaped revision are eliminated from the considerations. Repetitions of treatment are regarded on principle as unsuccessful in so far as the first treatment is concerned.

All these reservations have been made in order to obviate fallacies and mistakes.

The four last quinquennial revisions show that out of every 100 tuberculous subjects treated in 1897 there were still at the end of 1901, 27 fit for work in the sense understood by the invalidity law (that is to say to a degree excluding participation in invalidity pensions).

The after-results of the years 1898, 1899 and 1900 are regarded as being still more favourable, since out of every 100 tuberculous subjects treated during these years there were at the end of 1902, 1903 and 1904, 31, 32, and 31 who had preserved their working powers.

For males the duration of the success is not generally so favourable as with females; for out of 100 tuberculous males treated in 1897, 1898, 1899 and 1900 there were, five years later, in each instance only 25, 28, 30, and 30 capable of work, while the figures for females were 32, 38, 37, and 35.

Herr Bielefeldt suggests that these figures may at first sight appear insignificant, but he considers that they are satisfactory when it is borne in mind that the question is one of dealing with a grave chronic illness, and that the cases of failure in the treatment of tuberculosis are not much more numerous than in the case of other maladies.

The attempt to ascertain precisely whether the saving of the invalidity pension, aimed at by the Invalidity Authority in the application of the anti-tuberculous cure, is commensurate with the cost of such cure is regarded as hardly practicable owing to the fact that as the treatment generally begins well before the claim for invalidity pension there is no basis for determining how much of the invalidity could have been deferred without the intervention of the insurance institutions.

It is, however, pointed out that before undertaking the treatment for tuberculosis all the means at the disposal of medical science are employed in order to establish a correct diagnosis, and that in case of doubt as to the nature of the illness, the patient remains for a certain time under observation in the intermediate stations.

In a word, it is contended that the objections which have been raised by the adversaries of sanatorium treatment with reference to the diagnosis of invalidity insurance agents cannot be sustained.

The tuberculous state of insured persons being thus recognised, it is especially the early application of the necessary treatment which is held to promise a permanent success. On the other hand, the invalidity statistics show that out of 100 tuberculous males in actual receipt of invalidity pensions, and aged between 25 and 29, there are only 17 who, at the end of a year, are still enjoying the pension, and only four who are in receipt of such pension after four years.

Having regard to the fact that out of every 100 non-tuberculous subjects from 25 to 29 years of age there are 69 alive and still enjoying their pension after the end of a year, this success of the anti-tuberculous treatment is regarded as decidedly favourable.

Experience has taught that it is not expedient for recovered or partially cured tuberculous workmen to take up forthwith a former occupation which has, perhaps, caused or promoted their illness. Consequently the committees of the insurance institutions endeavour to procure from the employers special considerations for the discharged patients, and by way of furthering this object a commencement has been made in certain sanatoria in providing light work for the patients towards the termination of their treatment.

Some insurance institutions send their patients, at the end of the treatment, to special convalescent or "air-cure" establishments, in order to strengthen them and to slowly accustom them to work, while others have organised *agricultural colonies* with the object of gradually restoring cured tuberculous persons to their former occupations or of introducing them to a new one.

Similarly, in cases where cure is precluded by virtue of a definite and irremediable invalidity, the agents of the insurance are still able to contribute to the development of the public health in removing invalids—and especially the tuberculous—to *invalid homes*. Although by entering therein the invalids have to renounce their right to pensions the expense of their maintenance generally much exceeds such pension.

It is clear, therefore, that the insurance institutions which take advantage of their powers under section 24 of the law on insurance invalidity act both in the interests of their members and of the public health.

Already some of the insurance institutions possess their own invalid homes, while others are associated with private establishments by means of which they are able to offer to their incurable subjects, up to the time of death, the care which their condition requires.

THE MANNER IN WHICH THE INSURANCE SYSTEM AIDS IN THE PREVENTION OF TUBERCULOSIS IN GERMANY.

Although the Invalidity Insurance is not legally bound to do so, it has, as has been said, rendered great service in the campaign against tuberculosis by means of prophylactic measures. Having regard to the expenditure and organisation necessary to cope with the consequences of illness, the administrators of the insurance began to ask themselves whether it was not possible to prevent illness itself or to arrest its course, and as the result of investigation into the statistics relative to sickness it was found that illness was in a large degree only partially due to what may be termed personal causes, and that it was more frequently brought about by the general conditions of life under which the insured lived. The health and resistance of the workman depended upon his lodging, the manner in which he fed and clothed himself, the hours and nature of his work. Consequently, the sickness banks have become gradually involved in the domain of hygiene and prevention.

The first step in this direction has been the improvement of the housing conditions under which the insured members live. The officials of the banks when visiting the patients take note of defects as regards housing, lighting, ventilation, dampness, heating, drainage, etc., as also of the conditions relative to overcrowding.

By bringing these defects to the notice of the proper authorities and the patients into touch with sundry organisations, much improvement has already been effected. If the illness has been caused by unwholesome conditions of work, a communication to the factory inspector suffices to remedy the defects.

Finally the banks diffuse literature relative to hygiene among their members, and many of the larger ones have organised conferences in winter, at which physicians and others lecture on health questions in popular fashion.

The Invalidity Insurance has recognised the enormous advantage of early treatment, and it accepts the principle that in seeking to prevent illness it is possible to avoid dangers involving invalidity with much less expense than by treating the illness itself.

A liberal interpretation is therefore placed upon the regulations of the Imperial Insurance Office, and increasing importance is attached to placing its institutions and resources at the service of a properly understood system of prevention.

The numerous sanatoria are regarded as affording admirable opportunities for the diffusion of a knowledge of preventive measures, and side by side with the educational tendencies of these institutions there are numerous social organisations which exercise influence in a similar direction.

There is in the first place the Central Committee for the Erection of Sanatoria, which is under the patronage of Her Majesty the Empress of Germany. This committee has not only in a few years promoted the erection of nearly 100 sanatoria, fulfilling all the demands of hygiene, but it seeks also to make public the experiences of the several sanatoria and to perfect as far as possible the methods of treatment and prevention of tuberculosis by inviting periodical conferences among the medical officers of the several sanatoria. (See Map at end of this chapter.)

Among other associations whose aims are directed towards the same goal is the Central Committee of Anti-tuberculous Infirmaries, the German Association for the Promotion of Hygiene, the German Association against the Abuse of Alcoholic Drinks, and the Workmen's Gardens of the Red Cross, wherein numerous families with a tendency to tuberculosis and persons discharged from sanatoria seek to obtain or preserve health and strength. The direct and indirect subventions of the Invalidity Insurance afford to all these organisations valuable and often indispensable support.

Moreover, such of the capital of the insurance institutions as is not required for the payment of pensions, etc., is employed in improving the general sanitary condition of the people.

According to the official returns relative to the employment of capital, more than £1,650,000 has been utilised for the organisation of sanatoria in connection with the Invalidity Insurance, and more than £8,900,000 in the construction of hospitals, convalescent homes, sanatoria, workmen's pensions, public baths, etc., with regard to which Herr Bielefeldt adds, "It is an undoubted fact that these numerous establishments for tuberculosis would never have existed or been utilised if the insurance institutions had not supplied the funds and the patients."

Another sum of £6,650,000 has been employed in the construction of wholesome dwellings for the working classes.

In view of the foregoing account of the Insurance system in Germany, and of the multitudinous ways in which its resources can be employed in the anti-tuberculosis campaign, it is not possible to deny that such a system must of necessity exercise a powerful influence in promoting the physical well-being of the labouring classes in the Fatherland. It would seem, indeed, that the general result of the system must be to raise the working man in Germany into a social class other than that which he occupied prior to the introduction of this far-reaching policy

which enables him to procure advantages and privileges which formerly could only be secured by a class having financially a considerable balance at its disposal. Since, therefore, tuberculosis is largely a malady of the poorer classes, anything which will tend to exalt persons of this class above the financial and occupational disabilities inherent in it may be expected *à priori* to exert a favourable influence, both as regards the prevention and cure of tuberculosis amongst its members.

Herr Bielefeldt has little doubt as to this, and at the beginning of the paper which he communicated to the Paris Congress in 1905 he says: "Among all the factors entering into operation in the anti-tuberculosis battle in Germany the German Workmen's Insurance undoubtedly occupies the foremost place." And after furnishing figures relative to the general and tuberculosis death-rates, he adds: "It is, therefore, no exaggeration to pretend that such a result is due for the most part to the therapeutic and prophylactic measures of the German Workmen's Insurance."

PROGRESSIVE PROSPERITY OF THE GERMAN WORKING CLASSES.

It is, however, important to bear in mind the fact that there have been operating in Germany, as elsewhere, during the last 20 years other influences conducing generally to improvement of the public health, and which may be held on general principles to have been not without effect in a favourable direction on the behaviour of tuberculosis.

It is not necessary to enter here into a discussion as to whether the German working man is better or worse off than his English confrère. I am at present concerned solely with a comparison of the behaviour of tuberculosis in Germany in the past and in the present.

Restricting my observations to this aspect of the question, there can be little doubt that during the last 20 years there has been, as a whole, a very marked progress in the conditions, financial and material, of the German working classes.

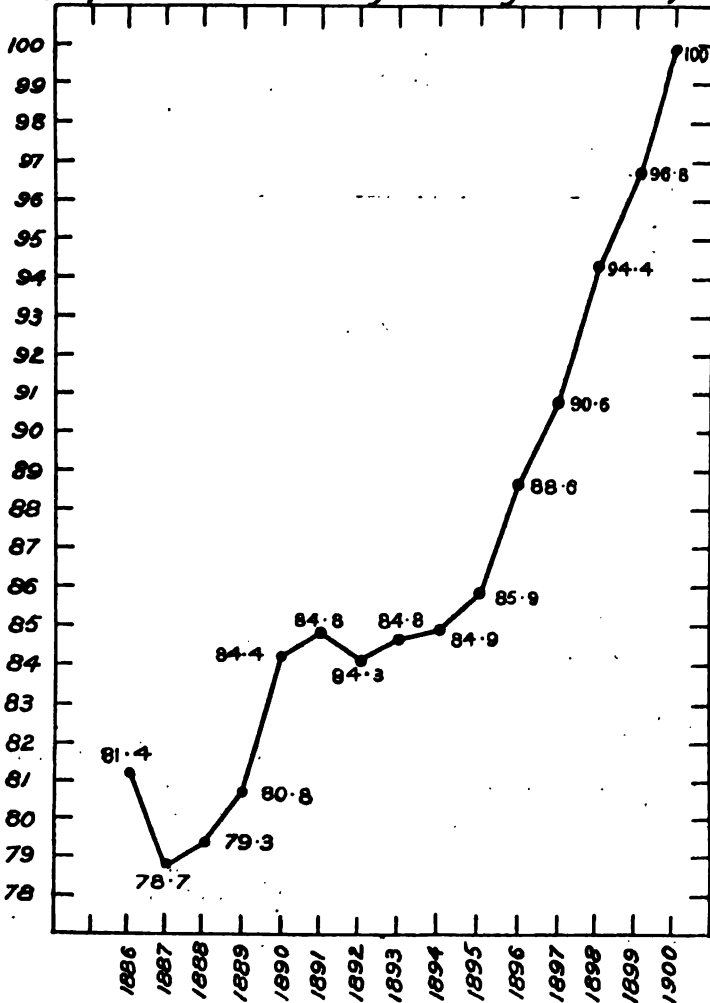
As regards wages, I reproduce a chart, furnished by Mr. W. J. Ashley in his "Progress of the German Working Classes in the Last Quarter of a Century," and taken by him, apparently, from page 280 of the Fiscal Blue Book for 1903.*

Although these figures are generally regarded as a fair index of the actual conditions which have been obtaining in Germany as a whole, it has been alleged that they lack precision owing to

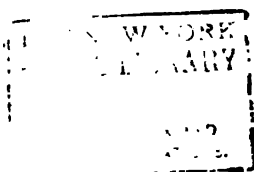
* British and Foreign Trade and Industry Memoranda. Statistical Tables and Charts prepared by the Board of Trade with reference to various matters bearing on British and Foreign Trades and Industrial Conditions, 1903 [Od. 1761]. Price 3s. 6d.

the fact that the "German insurance figures allow insufficient weight to the higher rates of wages"; by which it is implied that in computing compensation for accidents the amount varies according to the magnitude of the wages earned, with a maximum

*Chart showing German Wages 1886-1900
as returned to the Insurance Authorities
(Expressed in Percentage of Wages in 1900)*

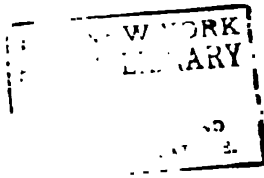


of 4 marks per day. Beyond this maximum it appears only one-third of the daily wage is allowed to rank for compensation purposes, i.e., supposing a workman's wages are raised from $5\frac{1}{2}$ to 7 marks (27 per cent.), such rise would appear on the



bread and potatoes has fallen 17 and 31 per cent, respectively,
while the cost of bacon has only increased to a trifling extent.

THE NEW YORK
PUBLIC LIBRARY
ASTOR LENOX AND
TILDEN FOUNDATIONS.



rye bread and potatoes has fallen 17 and 31 per cent. respectively,
while the cost of bacon has only increased to a trifling extent.

Beef and veal, which are less consumed, have risen 11 and 21 per cent. respectively.

In dealing, in 1903, with the course of money wages in foreign countries during the last 20 years of the nineteenth century, the Fiscal Blue Book states : " It will be seen that the table indicates a rise in all four countries. The rise is greatest in Germany and least in the United States. Next to Germany the United Kingdom shows the greatest rise, followed in order by France and Italy."

The share which the insurance system of Germany has had in aiding the industrial expansion of the Empire is to some extent indicated in the words used by Count Posadowsky, the Imperial Minister of the Interior, in the Reichstag on February 6th, 1906 :*

" If Germany has just experienced a vast industrial expansion equalled by no other country in the world during the same time, it is chiefly due to the efficiency of its workers. But this efficiency must inevitably have suffered had we not secured to our working classes, by the social legislation of recent years, a tolerable standard of life, and had we not, so far as was possible, guaranteed their physical health. Quite recently a representative of the chemical industry assured me of this in eloquent words."

* The German Workman : A Study in National Efficiency, by William Harbutt Dawson. P. S. King and Son, London, 1906.

CHAPTER III.

THE RESULTS OF SANATORIUM TREATMENT IN GERMANY.

Although this subject has been referred to in the preceding chapter, a more detailed examination of the matter is desirable, more particularly since data on sanatorium treatment in Germany, both as regards immediate and after-results, are more complete than is the case with those on the same subject for this country. Moreover, the German statistics possess the further and important advantage of being periodically subjected to scrutiny at the hands of the State.

There is an extensive literature upon the subject of sanatorium treatment in Germany, but in the résumé which is here given the account of it which was contributed to the Paris Tuberculosis Congress of 1905, by the Central German Committee for the erection of Sanatoria for Consumption has been in the main followed. It will therefore be understood that this chapter deals with the subject of sanatoria *from the German point of view*.* The article relative to sanatoria was compiled by Herr Gebhard of Lübeck, the Director of the Insurance against Invalidity and Old Age of the Free Towns.

There are in Germany as in this country considerable difficulties in drawing up a general statistical scheme applicable to all sanatoria, and there also exist similar objections to comparing the results of one sanatorium with those of another.

In Germany there obtain more than in England considerable variations in the methods of treatment adopted in the several sanatoria. They have, it is true, in common what is known as the hygieno-dietetic treatment, but other therapeutic measures, and especially the tuberculin treatment, are apparently practised in very varying degrees in the different institutions.

In addition to these differences there are in Germany probably great divergencies in the matter of the selection of cases, and these are especially accentuated in that country by the compulsory insurance system, a fact which in comparing German with

* L'Etat de la Lutte contre la Tuberculose en Allemagne. Mémoire présenté au Congrès International de la Tuberculose Paris, 1905, par le Comité Central Allemand pour la Création de Sanatoriums pour Tuberculeux, Publié par le Professeur Dr. B. Fränkel.

Statistik der Heilbehandlung von Tuberculösen und an anderen Leiden erkrankten versicherten bei den Versicherungsanstalten und zugelassenen Kasseneinrichtungen der deutschen Invalidenversicherung für die Jahre, 1897-1900, gewidmet dem Britischen Tuberculose Kongress, 1901, zu London vom Reichs-Versicherungsamt, Berlin, 1901.

English results must always be held in view. When in Germany a candidate for admission into a sanatorium is a member of the invalidity and old age insurance system it is easier to determine whether he shall be admitted than is the case with a candidate belonging to one or another of the charitable associations.

In the case of members of the insurance system it is, as a matter of strict legal procedure, only possible to undertake treatment when the illness threatens such incapacity for work as will lead to the payment of an invalidity pension, or if there is reason to suppose that a member already in receipt of invalidity pension will, by such treatment, recover his capacity for work. Such restrictions do not apply to those who are sent to sanatoria by German charitable institutions.

Clearly, therefore, a comparison between two sanatoria, the one fed by the insurance system the other by charity, might lead to erroneous conclusions, and similar discrepancies would arise in comparing sanatoria in which success of treatment is measured by capacity for work with those where this success is estimated by purely clinical standards. Although the distinctions above referred to theoretically obtain, it does not appear that in actual practice the differences between the several sanatoria are so great as these nominal distinctions would suggest. As a matter of fact in the greater number of the sanatoria there are found patients (often in the majority) from the insurance agencies; the legal restrictions referred to not being always strictly enforced, considerable discretionary powers are in practice apparently allowed. That a material immediate improvement as the result of treatment is as a rule to be reasonably anticipated, is obviously a fact which confers elasticity upon the statutes.

But in computing the value of results, these differences both in selection of cases and standards of "cure" must be remembered, especially so when any comparison is sought between figures based on capacity for work and figures based upon the medical aspect of the word "cure." It is contended by Herr Gebhard that from a humanitarian standpoint sanatoria justify their existence if they relieve the sufferings of the afflicted, even though return to work or "cure" does not result. So, too, from the "social security" point of view, in cases where the Insurance standard (capacity for work) does not apply, it is matter of advantage if the treatment diminishes the dangers of infection to other persons.

As regards the very important question of the duration of the results obtained Herr Gebhard points out that the time devoted to the treatment in Germany is as a rule insufficient for the establishment of what may be clinically regarded as a "cure."

In the case of patients who themselves defray the cost of their treatment, or on whose behalf payments are made by philanthropic agencies, the length of the treatment depends upon the funds available, and, consequently, the stay in the sanatorium is often all too short.

But the conditions are different in the case of patients who are supported by the invalidity insurances. Here the object is recovery of the power to work if it be lost, or the maintenance of such power if its loss be threatened. From the insurance point of view it is not necessary to suspend the treatment until the desired result is reached or until it is clear that this is not likely to be attained.

Experience in Germany has shown that the above object, which must not be confounded with "cure," when it is possible to attain it, demands a treatment of about three months. It is therefore such period that the insurance organisations have established as the duration of treatment.

There are, however, variations in the estimation of the standard period of treatment. Some have fixed it as a maximum, others as an average; this last method of interpretation suggesting that the stay will be prolonged when necessary or curtailed when working capacity of the person has been secured at an earlier date. This adoption of a three months' standard has apparently exercised a material influence upon the duration of the treatment in general, i.e. in institutions outside the scope of the "insurance": but it is necessary to repeat that the limit is based, not upon the point of view of "cure," but on that of the power to return to work. Hence, it is not a standard satisfactory to those who judge sanatoria from the view-point of "cure" alone.

If, however, it is difficult to group together the so-called popular sanatoria by reason of this diversity of standards, it becomes impossible when it is desired to extend these comparisons to what are termed private sanatoria or institutions for the better-off classes. There can be no question that in these latter institutions, which have served largely as the starting point and as models for popular sanatoria, arrest, or great improvement of even advanced cases of tuberculosis has been frequently obtained. But the conditions under which these private institutions have been carried on differ materially from those which govern the treatment practised at popular sanatoria.

On the other hand, these private sanatoria are unable to select their cases from the point of view of likelihood of cure as do popular sanatoria; although private institutions are more favourably circumstanced, in that they can retain their patients for a longer period, and such patients are far better able to lead the necessary healthy life after leaving the institutions than is the case with patients dealt with in the popular sanatoria.

Owing to these differences the statistics relative to sanatorium treatment to be now referred to do not comprise the results obtained at private sanatoria.

The reports of the results of the treatment in the German popular sanatoria are drawn up by the Imperial Health Office (Kaiserl. Gesundheitsamt), and the Imperial Insurance Office

(Reichsversicherungsamt). At the London Tuberculosis Congress of 1901 this latter office furnished the figures up to the end of 1900.*

More recent data, have, however, been since published, and as the reports of the two offices are compiled upon somewhat different lines it will be instructive to give a short summary of each, in doing which I shall continue to follow Herr Gebhard's account.

The results recorded by the Imperial Health Office are embodied in two articles by Privy Councillor Engelmann, and two volumes by Dr. Hamel.††

The object of Herr Engelmann's articles is to analyse the figures and to draw conclusions from them. The first article is based on the returns, relative to the treatment up to the end of 1898, which the medical officers at most of the existing sanatoria forward to the Health Office. The second article relates to the returns sent in since the commencement of 1899 to nearly the middle of 1900. The first article relates to 2,610 patients, and the second to 6,273 patients.

TABLE I.

Table showing (after deducting deaths) the conditions, *quæ* capacity for work, expressed in percentage of the patients discharged from sanatoria during the periods indicated.

	Per cent. of survivors in each instance.	
	1896-98.	1899-1900.
Completely capable of returning to previous occupation.	65·7	67·3
Completely capable of returning to another occupation.	6·5	7·1
Capable of partial work	12·7	14·6
Incapable of work... ..	15·1	11·0

*Statistics of medical treatment of persons suffering from tuberculosis and other diseases insured by the insurance institutions and admitted to the several establishments of German Invalidity Insurances for the years 1897, 1898, 1899, 1900, compiled by the Imperial Insurance Department and printed at the Imperial Printing Office, Berlin, 1901.

†1. Arbeiten aus dem Kaiserlichen Gesundheitsamte—XVIII. (1902) 143.

2. Tuberkulose—Arbeiten aus dem Kaiserlichen Gesundheitsamte. Deutsche Heilstätten für Lungenkranke, Geschichtliche und statistische Mitteilungen Berichterstatler: Dr. Hamel, Hilfsarbeiter im Kaiserlichen Gesundheitsamte mit 12 Tafeln. Cahier 2, 1904, und Cahier 4, 1905.

† See also "Industrial Efficiency," by Arthur Shadwell, M.A., M.D., Vol. II., pp. 16 and 43, Longmans, Green & Co.

The figures as regards physical condition were as follows :—

	Per cent. in each instance of all admissions.	
	1896-98.	1899-1900.
Cured or improved	Per cent. 84·6	Per cent. 87·7
Not improved	9·0	8·8
Sent out worse	3·7	3·1
Dead	2·6	0·5

It is claimed that the figures in both groups suggest that the results obtained during the second period were materially better than those obtained during the first, a fact which is attributed to better treatment and, more particularly, to the more careful selection of the patients.

It should be noted, however, that among the patients sent to the sanatoria there were some who at the time of admission still retained their working capacity so that the treatment cannot be credited in all instances with the capacity for work. But for the majority of those discharged this was the case.

The results as was to be anticipated varied materially, according to the stage of the illness, and for the period 1899-1900, the figures were as follows :—

TABLE II.

Per cent. of.	Cured or Improved.	Stationary.	Worse.	Died in Sanatoria.
	Per cent.	Per cent.	Per cent.	Per cent.
First stage ...	95·2	3·4	1·3	0·05
Second stage ...	89·9	6·9	3·1	0·1
Third stage ...	71·5	20·4	6·2	1·9

By Stage I. is meant (after Turban*) cases of catarrh of one or both apices, infiltration of one apex or of a slight dulness of one lobe at most, or of two half lobes.

By Stage II. is understood cases in which is found an infiltration of one apex, accompanied by bronchitis and extensive

* "The Diagnosis of Tuberculosis of the Lung with special reference to the Early Stages," by Dr. K. Turban, Privy Councillor of the Grand Duchy of Baden; Director of the Sanatorium at Davos, with an introduction by Sir Dyce Duckworth, M.D., LL.D., F.R.C.P., translated by Egbert C. Morland, M.B., B.Sc., Lond.

peri-bronchitis and infiltration of both apices or a pronounced and limited dulness of the whole of one lobe or of two half lobes.

Stage III. includes all conditions in excess of the second stage.

In 441 cases of the 5,986 patients treated in which this verification could be made, *i.e.*, 7·4 per cent., the state of the lungs on discharge was normal, or nearly so, and the following figures indicate the number of cases (1,784) in which there was a transference from one stage to another. The six first columns show the cases in which there was an improvement, *i.e.*, a transference from an inferior to a superior stage or to a re-establishment of healthy conditions, this latter being expressed by 0; while the six last columns show the cases in which there was deterioration in the local condition or in which death resulted :—

III. to II.	Improvement.					Deterioration.					
	III. to I.	III. to 0.	II. to I.	II. to 0.	I. to 0.	I. to II.	I. to III.	I. to death.	II. to III.	II. to death.	III. to death.
399	48	3	804	52	385	20	5	1	47	3	27

Information as regards the presence or absence of the bacillus of tuberculosis was incomplete for the period 1899–1900, but in each 100 cases of 3,582 patients for which complete returns were published,—

On admission { 52·8 per cent. had tubercle bacilli.
47·2 „ „ had none.
On discharge { 40·2 „ „ had tubercle bacilli.
59·0 „ „ had none.
(0·8 per cent. died.)

These investigations have been materially extended by those of Hamel, who dealt with the returns relative to the discharges made between 1896 and the end of 1900 by the different German sanatoria.

Hamel's returns, although they embody a considerable amount of the material dealt with by Engelmann, have been drawn up upon a different plan in that they have been elaborated for each sanatorium separately, but upon a uniform plan for all. These figures relate to the eight following establishments Grabowsee, Planegg, Ruppertshain, "Weickers Krankenhaus" at Gorbardsdorf, Friedrichsheim, Albertsberg, Belzig, and the Miners Bank sanatorium (Sülzhayn).

The data extend only to 1901, because after that date different inquiry forms were employed for the returns.

In the sanatoria of Ruppertshain, Belzig and Weickers Krankenhaus, there are both male and female patients; in the others males only.

TABLE III.

—	Returns.	No. of Patients.	Males.	Females.
Grabowsee	1896—1901	2,333	2,333	—
Weickers-Krankenheim	1896—1901	4,044	2,685	1,359
Ruppertsheim	1897—1901	1,824	1,339	485
Sülzhayn	1899—1901	691	691	—
Planegg	1899—1901	869	869	—
Friedrichsheim	1899—1901	795	795	—
Belzig	1900—1901	500	307	193
Totals ... ..	...	11,056	9,019	2,037

The stage of the malady in the case of persons admitted into the sanatoria in question, during the period under review was as follows, the figures relating to percentage of total admissions in each instance :—

TABLE IV.

STAGES.

Sanatoria.	Sex.	I.	I.-II.	II.	II.-III.	III.
Grabowsee	Males ...	76.9	2.1	9.6	9.7	31.7
Planegg	Males ...	21.4	23.5	25.9	15.5	13.7
Ruppertsheim	Males ...	22.2	22.5	20.5	18.3	16.5
Ruppertsheim	Females ...	30.5	21.7	16.6	14.6	16.6
Weickers-Krankenheim	Males ...	19.6	22.8	25.1	14.2	18.3
Weickers-Krankenheim	Females ...	10.9	27.6	28.2	15.8	17.5
Friedrichsheim	Males ...	4.2	23.0	27.9	14.3	30.6
Albertsberg	Males ...	20.3	36.7	27.9	9.6	5.5
Belzig	Males ...	29.6	21.2	11.3	15.3	22.6
Belzig	Females ...	34.2	18.1	9.9	15.5	22.3
Sülzhayn	Males ...	3.4	21.3	39.1	16.8	19.4

The average figures yielded by the statistics of the eight sanatoria now in question are the result of an analysis limited to patients who have been treated for at least six weeks in sanatoria. They are as follows :—

TABLE V.
STATE OF GENERAL HEALTH.

Number of patients treated in the Sanatoria mentioned, and concerning whom the state of the general health had been determined.	The general state of health per cent. of the patients was								
	Very good at the time of		Good at the time of		Not satisfactory at the time of		Bad at the time of		
	Admission.	Discharge.	Admission.	Discharge.	Admission.	Discharge.	Admission.	Discharge.	
Total 12,295	—	2·2	30·7	76·8	38·6	15·9	30·7	5·0	
Males 10,259	—	3·1	29·8	76·1	42·0	16·4	28·3	4·3	
Females 2,036	—	—	33·8	78·9	29·3	14·0	36·8	7·0	

TABLE VI.
BODY WEIGHT ON DISCHARGE.

Number of persons treated in the Sanatoria in whom the body weight was noted.	Body weight calculated on each 100 was—			Average increase of weight in kilogrammes.
	Increased.	Remained Stationary.	Diminished.	
Total ... 11,711	92·1	4·3	3·5	5·7
Males ... 9,704	92·6	4·1	3·3	5·9
Females 2,007	90·8	5·1	4·1	5·0

TABLE VII.
COUGH and EXPECTORATION.

Number of persons upon whom the effect of treatment as regards cough and expectoration had been ascertained.	On every 100 patients treated there has been					
	Cough and Expectoratation.		Cough without Expectoratation.		Neither Cough nor Expectoratation.	
	Admission.	Discharge.	Admission.	Discharge.	Admission.	Discharge.
Total... 12,344	88·7	67·4	5·0	5·4	6·5	27·2
Males 10,314	93·6	73·3	3·0	4·1	3·4	22·7
Females 2,030	75·7	51·8	10·4	9·1	14·0	39·2

TABLE VIII.
PRESENCE OR ABSENCE of TUBERCLE BACILLI.

Number of Patients.	Bacillus detected on Admission in following percentage of cases.	Bacillus detected on discharge in the following percentage of the cases in which it was present on Admission.		Bacillus found in following percentage of cases which had expectoration.	
		Bacillus present in	Bacillus not discovered and Expectoration ceased in	On Admission.	On Discharge.
Total 12,401	51·3	70·2	29·8	51·7	39·0
Males 10,364	51·7	68·0	32·0	52·3	38·7
Females 2,037	50·2	75·4	24·6	50·2	39·6

TABLE IX.
PRESENCE OR ABSENCE of FEVER.

Number of persons treated whose temperatures were recorded.	(a) Per cent. of cases with fever on Admission.	Percentage of cases in (a) having or not having fever on Discharge.		(b) Percentage of patients having no fever on Admission.	Percentage of cases in (b) which had no fever on admission, had subsequently		No indication.
		Fever.	No fever.		No fever.	Fever.	
Total 12,094	20·8	75·5	24·5	79·2	95·6	4·4	1·3
Males 10,075	17·9	79·5	20·5	82·1	96·3	3·1	1·5
Females 2,019	28·5	64·3	35·7	71·5	92·2	7·8	0·7

TABLE X.
NIGHT SWEATS.

Number of patients examined as regards night sweats.	Percentage having night sweats on Admission.	Percentage of those who had no night sweats on Admission who had or had not them on Discharge.		Percentage of those who had no night sweats on Admission.	Percentage of those who had no night sweats on Admission who had or had not them during their stay in the Sanatorium.		No indication.
		No Sweats.	Sweats.		No Sweats.	Sweats.	
Total 12,262	31·7	90·9	9·1	68·4	99·3	0·7	1·1
Males 10,263	32·8	91·3	8·7	67·2	99·2	0·8	0·5
Females 1,999	28·6	90·0	10·0	71·4	99·7	0·1	2·8

The actual condition of the lung at the termination of the treatment is obviously a matter of the first importance in connection with the sanatorium question, and in order to gauge the results obtained at the German sanatoria, Dr. Hamel has adopted a classification different from that already referred to on page 646, *i.e.* :—

1. *Slight affection limited to the small divisions of one lobe, especially at the apex of the lungs, and not extending beyond the clavicle or the spine of the scapula, with or without sonorous râles and fine crepitations.*

2. *Affection of the lungs surpassing limit 1, but not attaining to limit 3.*

3. *Infiltration of one or more entire lobes or signs of the formation of cavities.*

If the affection of the right and left lungs appertain to many stages, the state of the worst lung always determines the classification.

In comparing the state of lung on admission and on discharge of the patient with a view to estimating degree of improvement, account has been taken not only of whether the lung lesion has passed from a given stage to one less favourable, but whether also, if the stage of the malady has remained the same, there has been improvement or the reverse.

This process has resulted in the following classification :—

1. Absolute cure.
2. Relative cure.
3. Considerable improvement, raising the patient into a more favourable stage.
4. Slight improvement, the patient remaining in the same stage.
5. No change in the condition of the lungs.
6. Slight aggravation, the stage remaining the same.
7. Considerable aggravation, resulting in a less favourable stage.
8. Death.

By the term "absolute cure," is understood a case in which on discharge there has been a re-establishment in the lung of a condition, clinically speaking, completely normal.

By "relative cure," is implied those cases in which there has been disappearance of all râles, cough or expectoration, with the exception of a slight dulness and modification of respiratory bruit.

TABLE XI.

TABLE showing lung condition at date of discharge.

Number of patients treated in the eight sanatoria in whom the result of the treatment on the lung condition had been ascertained.	Expressed in percentages of cases treated.							
	Complete cure.	Relative cure.	Considerable improvement resulting in a more favourable stage.	Improved but still in same stage.	Stationary.	Aggravated within limits of same stage.	Considerable aggravation but in a stage less favourable.	Death.
Total .. 11,235	8'4	11'9	41'0	28'7	9'8	2'5	2'4	0'4
Males .. 9,975	3'0	10'1	41'8	30'3	9'5	2'4	2'6	0'4
Females .. 1,260	4'7	17'0	38'3	24'4	10'7	2'8	2'0	0'3

TABLE XII.

TABLE showing at date of discharge RESULTS of TREATMENT, having regard to the stage of the illness at the time of admission into the Sanatoria.

Number of Patients treated in the Eight Sanatoria and concerning whom the necessary Records have been made.		Lung condition on Discharge of those patients whose lungs on Admission were classified in the following stages.							
		Complete cure.	Relative cure.	Considerable improvement leading to a more favourable stage.	Improved within the limits of the same stage.	Stationary.	Aggravation within the limits of the same stage.	Aggravation into a less favourable stage.	Deaths.
Total .. 2,738		8.2	26.2	Stage of lung affection on admission—Stage I.			1.5 1.6 1.7	3.8 3.9 3.8	0.2 0.2 —
Males .. 2,441		6.9	23.5	—	54.7	6.4			
Females .. 353		11.7	33.8	—	59.0	6.6			
Total .. 2,451		4.9	23.0	Stage of lung affection on admission—Stage. I-II.			0.7 0.8 0.6	3.2 3.3 3.0	0.1 0.1 —
Males .. 1,960		5.2	23.6	47.0	17.9	4.1			
Females .. 501		4.3	21.5	53.5	18.9 15.2	4.1 4.0			
Total .. 2,553		1.3	10.5	Stage of lung affection on admission—Stage II.			1.1 1.3 0.7	3.6 3.1 5.1	0.3 0.3 0.1
Males .. 2,202		0.9	8.5	62.7	14.2	6.7			
Females .. 451		1.9	13.9	63.7 60.1	16.5 10.8	6.7 6.6			
Total .. 1,656		0.1	1.8	Stage of lung affection on admission—Stage II-III.			3.5 2.3 5.2	3.2 3.7 1.7	0.3 0.5 —
Males .. 1,353		0.2	1.7	64.8	11.8	13.3			
Females .. 307		—	3.4	63.8 57.4	16.0 11.6	11.9 13.4			
Total .. 2,366		0.3	0.7	Stage of lung affection on admission—Stage III.			7.9 7.3 9.5	— — —	1.5 1.6 1.2
Males .. 2,020		—	0.4	56.5	31.6	21.7			
Females .. 346		0.8	1.3	59.9 57.3	31.0 33.1	19.8 26.9			

TABLE XIII.

TABLE showing WORKING CAPACITY of PATIENTS at date of DISCHARGE.

GENERAL RESULTS.

Number of patients in the eight sanatoria whose degree of capacity for work had been determined		Percentage grouping of patients as regards their capacity for work on discharge.				Deaths.
		Completely capable of taking up former occupation.	Completely capable of taking up another occupation.	Partially fit for work.	Incapable of work.	
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Total,	12,255	65.5	5.2	17.1	11.7	0.5
Males,	10,192	65.0	6.4	17.6	10.3	0.6
Females,	2,063	66.7	1.7	15.6	15.4	0.3

TABLE XIV.

TABLE showing, on discharge, CAPACITY for WORK according to the STAGE of the ILLNESS on ADMISSION into the SANATORIA.

Number of patients to whom the present investigation has reference.		The degree of capacity for work of those patients who on admission were classed in the under-mentioned stages.				Dead.
		Completely capable of taking up former occupation.	Completely capable of taking up some other occupation.	Partially fit for work.	Incapable of work.	
		Stage I. on admission.				Per cent.
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Total,	2,802	87.6	3.7	4.8	3.8	0.1
Males,	2,447	86.3	4.9	4.7	4.0	0.1
Females,	355	90.9	0.7	5.1	3.3	—
		Stage I-II. on admission.				
		Per cent.	Per cent.	Per cent.	Per cent.	
Total,	2,465	81.4	5.1	9.5	3.5	—
Males,	1,964	79.2	7.1	10.5	3.2	—
Females,	501	87.3	1.3	7.1	4.3	—
		Stage II. on admission.				
		Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Total,	2,676	68.5	6.2	16.8	8.3	0.2
Males,	2,206	67.6	8.0	16.9	7.2	0.3
Females,	470	70.9	1.6	16.4	11.1	0.1

Table XIV—continued.

Number of patients to whom the present investigation has reference.	The degree of capacity for work of those patients who on admission were classed in the under-mentioned stages.				Dead.
	Completely capable of taking up former occupation.	Completely capable of taking up some other occupation.	Partially fit for work.	Incapable of work.	
Stage II-III. on admission.					
	Per cent.	Per cent.	Per cent.	Per cent.	Per cent.
Total, 1,646	46.7	7.1	30.1	15.7	0.4
Males, 1,339	48.6	8.1	28.2	14.6	0.5
Females, 307	41.8	4.2	35.3	18.7	—
Stage III. on admission.					
Total, 2,378	31.1	4.6	30.2	32.6	1.5
Males, 2,025	34.8	5.2	31.4	27.1	1.6
Females, 353	21.4	3.2	26.9	47.2	1.2

It is stated that the figures yielded by some of the annual reports are better than the averages given in the above tables which relate to the work of eight of the largest institutions, and it is added that the reports of the medical superintendents carefully abstain from any optimistic tendency. They abstain, too, more and more from designating a success by the term "cure." But because so large a number of the annual reports record few cases of "cure," it must not be inferred that the results of the treatment have been less favourable, since the cases of pronounced improvement have been much more numerous.

The eight sanatoria in question have a different character. Some (Friedrichsheim and Sülzhayn) appertain to cases sent in by the Invalidity Insurances, others to philanthropic institutions, and one (Weickers-Krankenheim), is the personal property of the medical director.

Consequently, the several points mentioned previously as determining the reception of patients into the establishments, and influencing largely the results, manifest themselves in the tables relative to the patients treated in the institutions.*

* The limits of the averages indicated in the different tables differ therefore much between themselves. Thus, for instance, the increase in the body weight was recorded at Planegg in only 83.6 per cent. of the patients under treatment, whereas increase has been observed at Albertsberg of 96.6 per cent., at Friedrichsheim of 96.5 per cent. and at Sülzhayn of 96.3 per cent. At Planegg only 13.9 per cent. of the patients treated left the sanatorium without cough or expectoration, whereas at Belzig 29.3 per cent. of males and 47.2 per cent. of females left without cough or expectoration.

The average results obtained at the eight establishments mentioned may therefore be regarded as averages for all the popular sanatoria, and, as has been already observed, the results of the treatment have constantly manifested improvement. The results as regards the figures prior to 1901 are sensibly inferior to those for the following years. Similarly, a large number of other sanatoria show improvement in their later results.

It is therefore inferred that the results actually obtained in all the sanatoria are not inferior to those given in the tables, and it is contended that it is not possible to suggest bias in favour of sanatoria if the average figures already given are taken as normal, not only for the eight sanatoria mentioned, but also as average figures for popular sanatoria generally. These figures should, it is urged, be regarded as satisfactory, irrespectively of the viewpoint from which they are approached. The criticisms to which they have given rise are governed, Herr Gebhard thinks, by the idea that the removal of the local affection is the true and only object of popular sanatoria. It is not improbable that this manner of approaching the problem is due to the fact that certain persons have possessed exaggerated conceptions as to the operations of these institutions and especially is this the case with those who have over-estimated their effect as regards the lungs.

Enthusiasts who at the commencement of the sanatorium movement indulged in extravagant statements as to the value of sanatoria now adopt an attitude of reserve, but Herr Gebhard points out that those who regard the foregoing figures as satisfactory must admit that these institutions are of very material utility. If, however, the problem be looked into critically it will be clear that although sanatoria are crowned with the greatest success they are one of, but not the only means, by which consumption may be attacked.

Reference is made later to the preponderating influence which sanatoria exert upon the surroundings of the patients, but from a preventive point of view attention may be drawn to Tables VII. and VIII. (pp. 649 and 650), which relate to expectoration and the presence or absence of tubercle bacilli.

If pulmonary tuberculosis is for the most part spread by means of the tubercle bacilli contained in the sputum of tuberculous persons, opportunities for the spread of infection are likely to become fewer and fewer in proportion to the number of persons who year by year cease to expectorate. But having regard to the enormous prevalence of tuberculosis it is unreasonable to anticipate any immediate and startling results.

The two questions which Herr Gebhard regards as deserving special attention are—

1. Whether the success hitherto obtained by the treatment of tuberculous persons in sanatoria continues to justify the admission of advanced cases into such establishments.

2. Whether it is desirable in future to abstain from submitting patients attacked with the first symptoms of tuberculosis to treatment in a sanatorium.

In both these cases the success obtained is claimed as justifying a continuance of the practice hitherto adopted.

Tables XII. and XIV. (pp. 653-655) show that the success of treatment whether in regard to the state of the illness or the capacity for work diminishes in proportion to the gravity of the illness at the time of admission, and if in particular cases satisfactory results can be noted in patients in the third degree, such a success as would justify a permanent return of the patient to work cannot be reasonably anticipated, and this is the least which should be attained, if it is desired that the insurance should defray the cost of the treatment.

Disastrous financial consequences would, it is urged, ensue to the insurance funds, the first duty of which is to accord an invalidity pension, were the principle to be abandoned that the probability of cure or the prevention of illness involving working incapacity, must be the *sine qua non* of a contribution on the part of the assurance.

This does not amount to discontinuing the treatment of advanced tuberculous cases, but it is necessary to limit such treatment to the means at the disposal of the assured. This view is confirmed by the satisfactory immediate success which sometimes follows the treatment of advanced tuberculous cases. It is found that the duration of such success is nearly always short.

It may be necessary in future to create special establishments and to devote them to the treatment of advanced cases.*

But as regards the second question, that of the treatment of quite early cases, the figures contained in the Tables XIII. and XIV. point to the desirability of not abandoning the mode of treatment at present in vogue.

From the fact that a considerable number of persons have suffered during life from early tuberculosis which has only been recognised after death, and which has then been shown to have become arrested without definite treatment to that end, it has been contended by some medical men that it is superfluous to send cases of incipient tuberculosis to a sanatorium.

But Table XII. shows that of patients in the first phase of phthisis, notwithstanding their treatment in a sanatorium, 6.4 per cent. have shown no improvement, while 4.3 per cent. have become worse.

Dr. Gebhard's inference from this is that those discharged as "improved" in the first stage include numerous cases which

* See also "Die Erste Internationale Tuberculöse-Konferenz," Berlin, 22-26 Oct., 1902, Bericht. Im Auftrage des Internationalen Central-Bureaus zur Bekämpfung der Tuberculöse herausgegeben von Prof. Dr. Pannwitz, Berlin, 1903.

without the help of treatment would not only fail to be cured but their illness would undergo a rapid development into a less favourable stage. The prospect which treatment in a sanatorium offers to persons in a more advanced stage is at all times, as will be seen from Tables XII. and XIV., more unfavourable than that pertaining to those of the first degree; so that by not sending patients in the first degree to a sanatorium many would lose the possibility of cure as well as the conservation of their faculty for work.

The average figures point, it is claimed, strongly to the desirability of continuing to send patients in the first stage of phthisis to sanatoria.

The figures also indicate that so far it has not been practicable to cure a very large proportion of phthisis patients who have passed through sanatorium treatment. Also they show that even in the case of patients in the first stage of the malady there are failures which are not always insignificant in number; while as regards patients in more advanced phases there have been an increasing number of "cures."

These anomalies should promote an investigation of the circumstances under which treatment leads in one case to no success, notwithstanding the best prospects, and in another case to a result very favourable in spite of the least hopeful appearances.

It is the duration of the success obtained by the treatment to which the statistics of the Imperial Insurance Office for the most part refer.

For a good number of years, beginning with 1899, this Office has undertaken extensive statistical investigations into the results of the treatment carried out by the assurances, and has issued reports thereon.

The following observations are regarded as arising out of these reports :—

They represent, in the first place, the curative success obtained by the treatment at the end of the years under consideration, dealing in the next place with the question as to whether the results obtained in 1903 and the four preceding years have been maintained.

The most recent investigations deal with the results of the treatment undertaken during the period ended in 1903, and furnish the figures obtained after the end of 1903 relative to the persons treated in that year and in 1902, 1901, 1900, and 1899.

The investigations undertaken for 1902 and 1901 already comprise a period of five years.

The statistics in question are limited to ascertaining the success of the prescribed treatment, merely by determining whether an incapacity for work, justifying a right to invalidity pension, has

or has not been removed by the treatment undertaken.* Has the capacity for work been maintained within the prescribed limits or has invalidity pension had to be accorded to persons who have been treated with success up to the end of the year and during the four following years, or have persons not received such pension notwithstanding their incapacity for work. Finally, how many of the patients under treatment have died during the years referred to or have been re-admitted for treatment.

The figures furnished by the Imperial Insurance Office fail to indicate whether the treatment which the assurances have bestowed upon their tuberculous members has been carried on within or without a sanatorium. But as a matter of fact, so far as the treatment of the tuberculous is concerned, the statistics apply as a rule, with but relatively insignificant exceptions, to the results of sanatorium treatment alone.

Out of 20,148 tuberculous subjects treated in 1903, 17,462 were received into sanatoria, and 499 into "convalescent establishments." Compared with these 17,961, only 2,187 were treated outside a sanatorium, that is to say, 560 in hospitals, 1,595 at spas, and 32 privately, *i.e.*, 89.1 per cent. went to sanatoria and only 10.9 per cent. to other places. The insurance figures may, therefore, be accepted as figures for sanatoria.

The success obtained at the end of treatment (*i.e.*, the immediate results) for all those suffering from tuberculosis and submitted to treatment was, according to the statistics of the Imperial Insurance Office, as follows ;—

TABLE XV.

A working capacity, on discharge, exceeding the standard of section 5, paragraph 4, of the Act of Invalidity Insurances was

	Obtained.			Not Obtained.		
	Per 100 persons.	Per 100 males.	Per 100 females.	Per 100 persons.	Per 100 males.	Per 100 females.
1897 ...	68	68	68	32	32	32
1898 ...	74	74	73	26	26	27
1899 ...	74	74	73	26	26	27
1900 ...	72	72	72	28	28	28
1901 ...	77	77	77	23	23	23
1902 ...	78	77	80	22	23	20
1903 ...	80	79	82	20	21	18

If the calculations are limited to those remaining after the elimination of persons who were sent back as unsuitable for

* According to section 5 of the Invalidity Law incapacity for work exists if the assured has no longer been able to earn a third of that which a person of healthy body and mind of the same degree of education and of the same district has usually earned.

treatment or for disobedience or who left the institution voluntarily, the figures relative to success are increased by 3, and those indicating failures are diminished by the same amount.

The figures of successes obtained by the different insurance institutions, of which the above figures represent the average, differ materially. For example, for the year 1903 one of the institutions yielded 96 per cent. of cases capable of work on discharge, another only 30 per cent.

The explanation of these anomalies is no doubt to be found in the different methods adopted for the selection of cases and in the estimation of the success obtained.

The lower rates relate to establishments in which there are only a few of the insured amongst the patients, where the principles determining the selection of patients have not yet been formulated, and where the arrangements for satisfactory treatment are not yet complete. If regard be had only to the establishments where the treatment of the tuberculous subjects is carried on a larger scale, *i.e.*, these 21 establishments in each of which during 1903 the treatment of at least 250 tuberculous cases was completed; the figures indicating success are much nearer alike, *i.e.*, between 92 and 96. The average for these 21 establishments (the other 19 relate only to 2,506 treated in 1903), amounts to 80·62, and it is thus higher than the average for all the institutions.

The figure 80 as the average of the whole does not, it is thought, present the results for 1903 in too favourable a light, since the foregoing table shows marked improvement in the figures; for males from 68 in 1897 to 80 in 1903; for females from 68-82.

AFTER-RESULTS.

The main value of the statistics of the Imperial Office of Insurance is to be found in the information as to whether the results obtained on discharge are of long duration, *i.e.*, if the restored capacity for work is maintained.

In cases where investigation has established the death or invalidity of persons who have been under treatment, it is necessary to observe that this fact in itself cannot be regarded as proving that the treatment has failed in its object. The death and invalidity of persons here in question may in particular cases have been caused by other evils than that of tuberculosis for which the treatment was instituted. Statistics of the Imperial Office do not, however, mention this point, and it is desirable that they shall do so.

The results obtained at the end of 1903 are shown in the following tables, the first of which indicates what percentage of persons treated for tuberculosis have preserved their capacity for work, while the second indicates the same facts for persons *treated with success*.

TABLE XVI.

Year in which treatment ended.	Out of every 100 tuberculous patients treated—				
	There were in the years indicated the undermentioned numbers who possessed at the end of the treatment the desired success—capacity for work in the sense of the Invalidity Law.				
	There were year by year, as indicated below, the following numbers still retaining their capacity for work.				
	1899.	1900.	1901.	1902.	1903.
1899 ...	74 ...	...	...	...	...
1900 ...	72 ...	...	...	...	...
1901 ...	77 ...	...	...	...	...
1902 ...	78 ...	...	...	...	...
1903 ...	80 ...	...	...	...	...
	67	48	40	35	32
	—	66	49	41	37
	—	—	70	53	45
	—	—	—	73	59
	—	—	—	—	75

TABLE XVII.

Year in which treatment ended.	Showing per cent. of tuberculous persons treated, the number who had regained their capacity for work at the end of the treatment, i.e., who were not in receipt of invalidity allowance.				
	Out of every 100 persons treated with success there were, at the end of the years indicated, the following number still maintaining their condition.				
	1899.	1900.	1901.	1902.	1903.
1899 ...	74 ...	...	...	...	...
1900 ...	72 ...	...	...	...	...
1901 ...	77 ...	...	...	...	...
1902 ...	78 ...	...	...	...	...
1903 ...	80 ...	...	...	...	...
	92	67	55	47	43
	—	92	69	58	52
	—	—	93	72	62
	—	—	—	94	76
	—	—	—	—	94

Commenting upon the above tables Herr Gebhard draws attention to the gradual increase of the duration of the success obtained, and he points out that the figures for the after results, as shown in the last tables, increased at the end of the first year from 92 to 94, for the second year from 67 to 76, for the third year from 55 to 62, and for the fourth year from 47 to 52.* These increasingly satisfactory results are regarded as probably due to a more rigid choice of patients sent to sanatoria, and partly also to the better treatment of patients at these institutions. It is added, however, by Herr Gebhard that a great part of the success is due to the influence which the sanatorium exercises on the subsequent habits of life of those discharged.

Other figures show that the duration of success is much more lasting for females than for males, and these points are clearly brought out in the following tables.

* N.B. It is interesting to note from a report quite recently published by the Imperial Insurance Office relative to sanatorium statistics for the five years 1902-1906 that of the patients treated in 1897 only 27 per cent. were capable of working after a lapse of five years, whereas of those treated in 1902, 42 per cent. were thus capable five years later.

TABLE XVIII.

TABLE SHOWING the COMPARATIVE RESULTS of the SANATORIUM TREATMENT ON MALES and FEMALES.

Year in which treatment ended.	Percent. of those treated who showed on discharge a capacity for work at least equal to that provided by the Invalidity Insurance Laws. Males (Females).				Per cent. of all those treated who retained year by year their capacity for work.				
					1899.	1900.	1901.	1902.	1903.
1899 ...	74 (73)	...	...	...	67 (67)	48 (51)	39 (43)	33 (40)	30 (37)
1900 ...	72 (72)	...	...	...	—	66 (67)	48 (52)	40 (46)	36 (40)
1901 ...	77 (77)	...	...	...	—	—	70 (72)	53 (60)	45 (52)
1902 ...	77 (80)	...	...	...	—	—	—	72 (76)	57 (62)
1903 ...	79 (82)	...	...	...	—	—	—	—	74 (77)

TABLE XIX.

Year in which treatment ended.	(a) Per cent. of total treated who showed on discharge a capacity for work within the meaning of the Invalidity Insurance Laws. Males (Females).				Per cent. of (a) (those treated with success) who have retained year by year their working capacity.				
					1899.	1900.	1901.	1902.	1903.
1899 ...	74 (73)	....	...	...	91 (92)	65 (70)	53 (60)	45 (55)	41 (51)
1900 ...	72 (72)	...	...	...	—	92 (95)	68 (72)	56 (64)	50 (57)
1901 ...	77 (77)	...	...	...	—	—	92 (94)	70 (78)	60 (68)
1902 ...	77 (80)	...	...	...	—	—	—	93 (90)	75 (79)
1903 ...	79 (82)	...	...	...	—	—	—	—	94 (94)

This advantage on the part of females would appear to be gradually increasing and some figures by Reiche relative to Hamburg accentuate this point still more markedly. The latter author attributes the difference to the fact that the illness at the beginning of the treatment was less advanced with females than with males, but it has to be added that this experience, which is based upon observations made at Hamburg, is not met with in such a pronounced degree elsewhere.

Reiche finds, too, that females more often than males are forewarned by symptoms, such as headache and lassitude, prior to the appearance of the lung symptoms, a surmise for which the anæmic condition of the females is offered as an explanation.

Moreover, it is believed that females seek medical advice earlier than males and, being often in service, benefit more than men by the advice of their employers; and that females leaving sanatoria are, as a rule, exposed less than males to circumstances which militate against the success obtained.

The figures of the four last tables furnish the average for all the Assurances against Invalidity and Old Age.

The enormous differences already ascertained in the results obtained at the end of the treatment are apparent also in the same degree in the figures relative to lasting results obtained by each of the Assurances. Persons submitted to treatment by one Assurance maintained the improvement secured longer than those treated by another Assurance.

The following tables show the extent of these divergences by comparing three establishments, wherein the figures of the results obtained, surpass the average of three others, where the figures remain below the average. At all these establishments the treatment of tuberculosis is carried out on an extensive scale. The first table relates to the duration of the results obtained in 1899, the second to the results obtained during 1901.

TABLE XX.

Particular Banks of the Invalidity and Old Age Insurances.	Per cent. of total persons who were treated in 1899 who, at the end of such treatment, had regained their working capacity in the sense understood by the Invalidity Laws.	Per cent. of all persons treated during 1899 who have, year by year, retained their restored working capacity.					Per cent. of persons treated <i>with success</i> in 1899 who have, year by year, retained their regained working capacity.				
		1899.	1900.	1901.	1902.	1903.	1899.	1900.	1901.	1902.	1903.
Saxony	86	79	60	51	45	42	93	71	60	53	50
Berlin	85	70	69	59	53	50	93	82	72	65	61
Norddeutsche Knappechafts Pension Bank.	75	69	58	52	47	43	93	78	69	63	57
Upper Bavaria	69	56	37	31	22	6	81	56	50	34	10
Schleswig Holstein	75	62	41	25	24	19	82	54	34	32	27
Westphalia	82	62	47	39	32	29	85	57	48	39	35

Particular Banks of the Invalidity and Old Age Insurance.	Per cent. of persons who were treated during 1901, and who, at the end of such treatment, had regained their working capacity in the sense understood by the Invalidity Laws.	Per cent. of all cases treated during 1901 who have, year by year, retained their restored working capacity.			Per cent. of those cases treated <i>with success</i> in 1901 who have, year by year, retained their restored working capacity.		
		1901.	1902.	1903.	1901.	1902.	1903.
Saxony	88	79	68	57	91	78	66
Berlin	84	78	75	65	95	91	64
Norddeutsche Knappechafts Pension Bank.	97	95	71	63	98	12	72
Upper Bavaria	73	63	56	50	92	82	72
Schleswig-Holstein	81	69	50	40	86	60	46
Westphalia	86	74	51	40	86	63	46

A comparison of the foregoing tables shows that although in so far as the durability of the results is concerned, there has been an improvement during the two periods referred to, there are still very material differences between the results secured at the several sanatoria. The Assurances, doubtless, employ very different principles in the selection of patients for sanatorium treatment and, also, there is much variety among the patients sent in. So, too, it is necessary to point out that there are divergences among the sanatoria in the methods adopted for training the patients to carry on their future lives upon sound hygienic lines and the after results are not unlikely to vary in accordance with these differences. The statistics of the Imperial Insurance Office, notwithstanding the valuable material at their disposal, relate only to one sort of result, *i.e.*, recovery of the capacity for work, surpassing the standard laid down by the Invalidity Law. Consequently, they contain no information as to why, in some cases, the results remain below those procured in other cases. It is necessary also to consider, Herr Gebhard states, whether the statistics ought not to be completed by a further division of material and be re-considered from various new points of view so as to shed a little light on the causes of certain deviations or differences as well as on the means to be employed for arriving at better results than have been hitherto secured.

The results so far obtained, are considered as satisfactory, having regard to the recent nature of the whole organisation, and it is thought that the divergent degrees of success afford an indication that a marked improvement in the general results may eventually be attained.

SOME ADDITIONAL DATA.

Beyond the results previously dealt with the most reliable are those which have been drawn up by the Insurances of the Free Hanse Towns (Hamburg, Bremen and Lübeck) which possess voluminous data. These records admit into their statistical tables only such material as can be regarded as thoroughly reliable. The results obtained are registered on the discharge of the patients by the medical director of sanatoria and, if possible, immediately after the return of the patients to their homes, by the medical advisers of the Insurance.

The verifications made by the duly appointed physicians form the basis of those statistics, and so far as possible the patients are submitted at varying intervals to additional examinations on the part of doctors delegated for the purpose.

In all these examinations the three following points are held prominently in view, *i.e.*, the result of the treatment on (1) the local affection, (2) the general state of health, (3) the capacity for work.

As a considerable body of statistics on these points has already been furnished it is proposed to deal here only with the question of the capacity for work, more especially as the classification adopted as regards local affection and state of health in the statistics of the Free Towns is somewhat different from that already given.

It may, however, be observed that the figures which are omitted show that the after results were unfavourable in a certain number of early cases, in which a substantial improvement had been obtained on discharge. On the other hand, a large number of cases which manifested a grave character at the beginning of the treatment, and with whom no great success was obtained while in the sanatoria, improved materially after their discharge.

The figures in the large table, pages 667-668, relative to capacity for work, are taken not from the report of Herr Gebhard which has been for the most part followed hitherto, but from a return distributed in the German Section at the Paris Congress in 1905. By way of bringing out the facts contained in the table comprising the figures, a graphic representation, taken also from the sheet referred to, follows the statistical data.

Another set of instructive figures are those relating to the Tuberculous Workmen of the Prussian and Hessian Railway Companies. Such figures have reference to about 250,000 workmen, all of whom are members of the Pension Bank of the Prussian and Hessian Railway Company, which company defrays the cost of the sanatorium treatment of its tuberculous workpeople. This branch has been created in accordance with the provisions of the Invalidity Insurance Law of July 13, 1889, and its principal object is to provide pensions in case of invalidity. In 1904 it paid 1,832,889 marks in pensions.

The Pension Bank accords, over and above the legal pensions, supplemental allowances to widows and orphans, and it sometimes defrays the expense of funerals. It paid, under the foregoing heads, 252,422 marks during 1904.

The necessary funds are furnished by the workmen and the railway companies, each contributing equal parts, while the companies pay in addition the administration expenses of the Bank.

The Bank administration has the right to send patients into homes in place of according them pensions, and with this object invalid homes have been erected. In order to improve the homes of their workpeople the Bank allows mortgages on small properties, and it has, so far, devoted to the construction of wholesome and cheap dwellings nearly 11 million marks.

Sanatorium treatment may be accorded by the Bank in cases where it is believed that invalidity may be prevented, and, in 1904, 709 tuberculous workmen and 402 attacked with other maladies, were compelled to follow treatment on these lines.

During treatment in the sanatoria, which extends over an average period of 15 weeks, pecuniary assistance has been

accorded to the patients' family, amounting in all to the sum accorded by the sickness banks to their patients.

Since April, 1904, the Pension Bank has opened two sanatoria for tuberculosis. Stadtwald Melsungen (near Cassel) with 120 beds, and Moltkefels, near Schreiberhau (Silesia) with 100 beds.

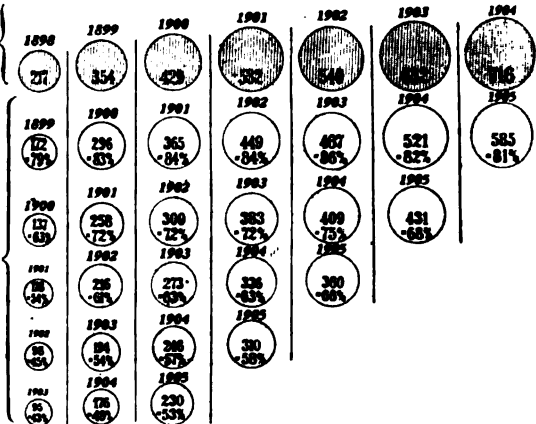
These two sanatoria are so arranged that the latest scientific and technical inventions can be utilised for the treatment of the patients, and into these two institutions tuberculous cases only are admitted. In the event of there being doubt as to the nature of any given case, the tuberculin test is employed.

The figures given below in diagrammatic form, relative to the result of the treatment, are regarded as thoroughly reliable, since all patients who have returned to their former occupations continue under treatment by the medical officers of the railway companies, and the after-results of the sanatorium treatment are thus checked every year. The large number of permanent successes which is recorded has been obtained by prolonged treatment in the sanatoria, by the repetition of the treatment in subsequent years if necessary, by cautious after-care, or by transferring the patients into a more wholesome occupation.

SUCCESS OBTAINED BY TREATMENT IN SANATORIA FOR CONSUMPTION.

Number of cases of tuberculosis treated in the sanatoria from 1898 to 1904.

Out of those treated there were still year by year the numbers indicated in the diminishing circles still completely capable of work.



After discussing certain purely economic aspects of the sanatorium treatment, Herr Gebhard expresses the opinion that it would be fallacious to attempt to appraise the value of these institutions merely on the improvement wrought in the state of health of a certain number of patients and, on surmise, as to the possibility of such patients maintaining their capacity for work.

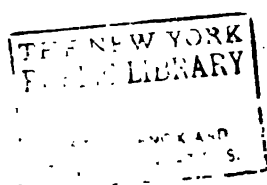
It would not, he thinks, be doing justice to sanatoria if no regard was paid to the amount of inconvenience and chagrin

BLE XXI.

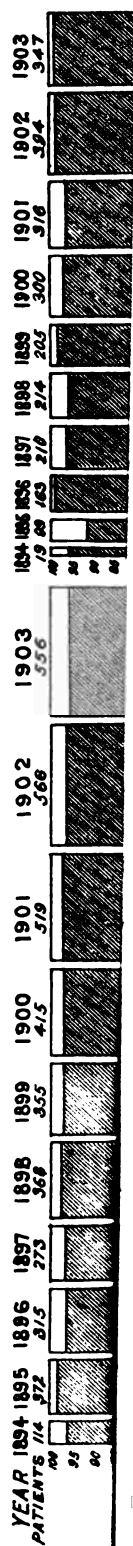
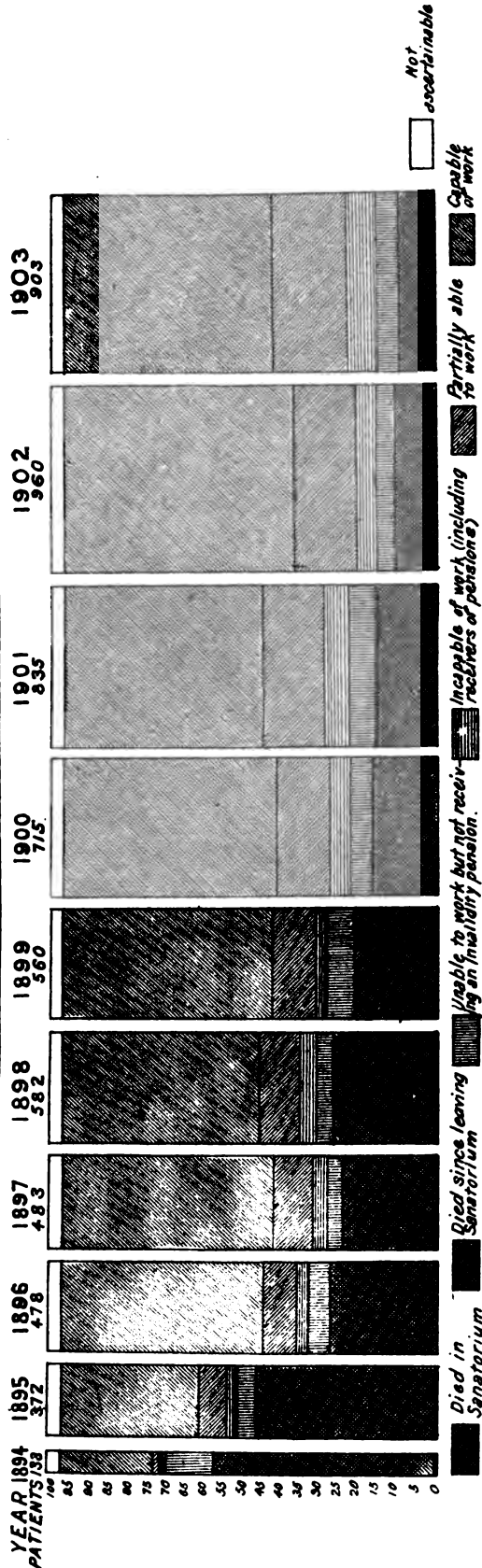
Result of the Medical Treatment
 Medical Treatment 6,025 Persons

In the years mentioned in the table											
	1897.			Total.		1903.			1898-1903.		
	Total.	M.	F.			Total.	M.	F.	Total.	M.	F.
	0'21	0'37	—	0'17		0'22	0'18	0'29	0'17	0'21	0'09
'88	24'64	32'60	14'29	26'80	360	9'75	10'97	7'78	20'38	26'32	10'54
'14	3'52	4'03	2'88	4'81	55	6'42	8'27	3'46	5'86	6'66	4'54
'29	3'73	2'20	5'71	3'78	68	7'31	7'73	2'63	4'61	4'68	4'50
'43	7'26	6'23	8'57	8'59	63	13'73	16'00	10'09	10'47	11'34	9'04
'27	10'14	6'59	14'76	10'65	68	19'05	16'19	63'63	13'29	11'47	16'31
'58	53'83	50'55	53'09	50'52	401	53'93	52'16	56'77	52'35	47'17	60'93
'84	3'93	3'66	4'29	3'27	58	3'32	4'50	1'44	3'94	3'49	3'09
'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	0'32	0'41	—
	—	—	—	—	—	—	—	—	2'77	3'03	1'67
'76	—	—	—	—	—	—	—	—	6'10	6'98	2'51
'05	5'04	6'74	—	—	—	—	—	—	7'41	7'99	5'02
'05	15'97	15'73	16'67	3'85	4	—	—	—	5'13	5'36	4'18
'29	24'37	22'47	30'00	31'41	27	—	—	—	9'85	9'30	12'13
'06	21'01	22'47	16'67	22'44	22	—	—	—	12'23	11'93	13'39
'76	7'56	6'74	10'00	15'38	16	—	—	—	11'08	11'12	10'69
'76	11'77	13'49	6'66	9'62	992	—	—	—	14'96	15'16	14'39
'52	6'72	5'62	10'00	5'77	647	21'59	22'95	18'52	13'52	13'45	13'81
	5'88	4'50	10'00	8'97	992	70'45	68'83	74'07	14'58	13'45	19'25
'76	1'68	2'24	—	2'56	269	7'96	8'20	7'41	2'04	1'82	2'93
'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00
	—	—	—	—	—	—	—	—	—	—	—
	—	—	—	—	—	—	—	—	0'57	0'80	—
	—	—	—	—	—	—	—	—	1'14	1'20	0'97
'00	—	—	—	—	—	—	—	—	2'27	2'00	2'91
'00	5'88	9'09	—	—	—	1'72	2'17	—	2'83	3'20	1'94
'00	11'77	18'18	—	3'57	5	—	—	—	2'83	3'20	1'94
	23'53	18'18	33'33	17'86	15	—	—	—	5'38	4'60	6'80
	5'88	—	16'67	17'86	15	—	—	—	6'23	6'40	5'83
'00	5'88	9'09	—	28'57	35	1'72	—	8'33	14'73	14'40	15'54
'00	17'65	9'09	33'33	3'57	572	12'07	15'22	—	22'38	23'60	19'42
	11'76	9'09	16'67	25'00	2557	48'28	50'00	41'67	24'36	23'60	26'21
'00	17'65	27'28	—	—	67	36'21	33'61	50'00	15'29	15'60	14'56
'00	—	—	—	3'57	14	—	—	—	1'99	1'20	3'88
'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00	100'00
'18	24'22	22'34	26'61	20'79	2061	1'77	1'97	1'44	13'86	14'11	13'45
'83	1'24	1'47	0'95	1'48	1	—	—	—	0'78	0'98	0'44

persons mentioned under (4) were unfit for military service, etc.)



TOTAL NUMBER OF PATIENTS.





spared to the families of those successfully treated, and of the degree to which the return of the capacity for work has increased the well-being of the families of tuberculous persons. The influence of sanatoria in increasing national prosperity extends far beyond the immediate class for which they were created. These institutions owe their existence, above everything, to a desire to raise the level of the general health, and in their turn the sanatoria have contributed materially to public health measures. They have, moreover, shed light on the importance of general hygiene among the working classes, who have hitherto been far from appreciating its advantages.

It is regrettable that a specific cure for tuberculosis has not yet been discovered, but even were such forthcoming it would not detract from the value and importance of a healthy life such as is inculcated into all patients admitted into sanatoria. The knowledge thus gained shows them that in order to deal with tuberculosis it is of as much importance to employ all means favouring the general health as to avoid everything which is calculated to exercise a baneful influence upon it. Some thousands of individuals are now following every year in sanatoria what may be termed a practical course of hygiene, which cannot fail in some degree to influence not only their own after life but the lives also of others with whom they are brought in contact.

But if it cannot be expected that all will profit to the full by their experiences, the need of fresh air which is enjoined on the patients during their sojourn in the sanatoria should influence them on returning home, rendering them more anxious to possess it than was the case before they fell ill. An educated desire for fresh air may be trusted to transmit itself to the family and to be engendered in a larger measure in succeeding generations. It is practically the same with regard to a taste for cleanliness, as a consequence of the constant care which is taken to impress upon the patients the necessity of avoiding all uncleanness both of body and surroundings.

Between sanatoria which may have procured equally good immediate results, it is the one wherein the patients have best learnt to conduct their future lives which will be able to secure the most satisfactory records as regards the duration of results.

The efficiency of sanatorium treatment is especially manifested in the control of expectoration as it is by this agency that the patient is likely to endanger the health of those with whom he is brought in contact. The harmlessness of these expectorations once brought about, tuberculous persons, or at any rate those not in an advanced stage, present but a slight danger to their fellows. A decrease in the number of these persons who thoughtlessly diffuse tubercle-bearing sputum must, it is contended, exercise an influence in limiting the spread of tuberculosis.

During the last decade about 100,000 tuberculous persons have received treatment in sanatoria, into which there will enter

annually 25,000 to 30,000 patients. Although all these patients do not quit the sanatoria without tubercle bacilli in their sputum (see page 656 and Tables VII and VIII, pages 649-650), a wholesome effect cannot fail to be produced, provided that the patients appreciate the necessity for rendering their sputum innocuous.

That which bestows special importance upon sanatoria is the fact that only patients in the first stage of consumption can reasonably expect to be cured, and that, as a general rule, advanced cases ought never to be admitted. It is thus that the masses of the German people have learnt the value and importance of a systematic treatment in the first stage of the malady.

Notwithstanding this beneficial action of sanatoria, their most zealous defenders would not, Herr Gebhard thinks, wish to contend that tuberculosis can be made to disappear by means of these institutions alone. It would be necessary in order to effect this wholly, or in great part, to possess, in addition, a whole series of institutions and to promote their co-operation during very many years.

But the institutions of this nature, which are at present in existence, have been brought about, so to speak, in consequence of the scope of sanatoria. Without sanatoria the masses would have missed the impulse to create innovations of the same *prophylactic* nature such as those, for instance, which have for their object the care of advanced cases.

In numerous parts of the German Empire there are arising to-day organisations of a miscellaneous nature for the control of tuberculosis. But all this has been evolved in direct connection with the previous development of sanatoria, and the movement is due in part to the same persons who promoted the erection of sanatoria with the obvious intention of, as far as possible, augmenting their action.

The sums spent in the erection of sanatoria in the German Empire and the amounts devoted annually to their maintenance are, Herr Gebhard admits, very considerable. But such expenditure is held to be justified if account be taken of the influence which the results exercise on the economic prosperity of the patients and of their families as well as on the population as a whole. This view is thought to receive support from a consideration of the benefits accruing from a better development of the next generation and of the useful results which the sanatorium movement has brought about in the promotion of public health. The expenditure is regarded as having been fully justified by the good already obtained, and nothing is thought to bear testimony to this belief more than the increase everywhere observed in the number of sanatoria erected.

71-54.

**This book is under no circumstances to be
taken from the Building**

[illegible]

SD MAIL 1918

